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NOVEMBER 1950

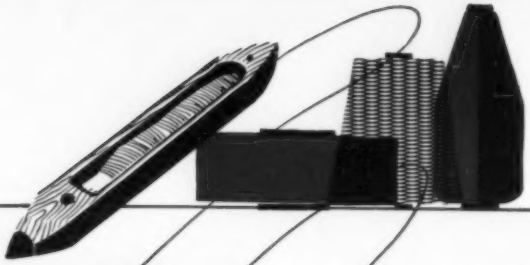
BUSINESS · ENGINEERING · INDUSTRY

U. S. Export Control Program p17 ➡

Carbon Restoration for Steel p20 ➡

Synthetic-Fiber Progress p40 ➡

Table of Contents—Page 3



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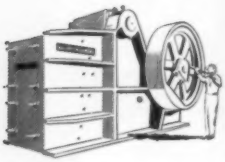

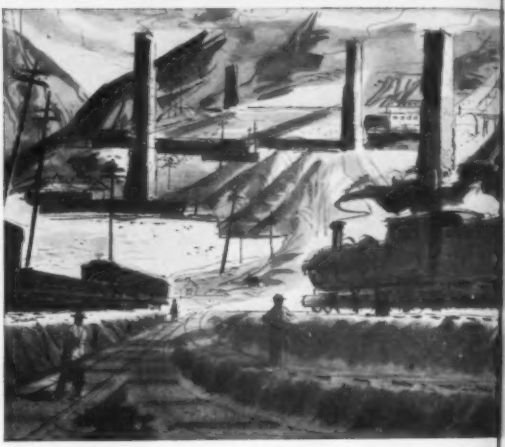

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NOVEMBER CONTENTS

U. S. Export Control Program 17
Rearmament Around the World 18
Carbon Restoration for Steel 20
Line-Construction Shortcuts 25
Insulation—Why, Where, How 30
Today's Lighting Equipment 35
Synthetic-Fiber Progress 40
New Porcelain Wall Facing 44
Economic Use of Gas Turbines 47
New Thread Cuts Bolt Breakage 52
Hints on Buying a Truck 57

AVIATION
Effect of Air Bleed 27
Bearing Lubrication Study . . . 32
Jet-Engine Overhaul 54

CHEMISTRY, METALLURGY
New Metal Powders 26
Synthetic Rubber, Less Styrene . 28
Continuous Hygirtol Process . . 45

CONSTRUCTION
In-Place Road Surfacing 22
Desert Bridge Deck 29
Swamp to Road in 6 Hours . . 53

ELECTRICITY, POWER
How to Maintain Condensers . 24
Locating Shunt Capacitors . . . 34
More Steam, Lower Cost 43

ELECTRONICS, RADIO
Swiss Theater Television 42
Industrial UHF System 53
Electronic Anesthesia Control . 59

FOOD PROCESSING
Salad Oil from Rice Bran 22
Oven-to-Home Pie Pans 26
Chemical Speeds Deglazing . 46

MECHANICAL DESIGN
Welds Beverage Containers . . 45
Hot-Gas-Weld Thermoplastics . 54
Turning Cams Saves Time . . . 59

METALWORKING
German Slab Shear 24
Induction Hardening Arbor . . 32
Clean Magnesium Easier 56

MINING, PETROLEUM
New Oil-Well Explosives 24
Fresh Water Carves Salt 43
Conveyor Cushions Loads . . . 59

PLANT MANAGEMENT
Watchmen Start Production . . 27
Fire-Fighting Hints 36
Modern Exhaust Ventilation . . 55

TEXTILES
Textile-Mill Fluid Drives 26
Nylon Teasel Brushes 32
Improves Looper Operation . . 34

TRANSPORTATION
Crush Ice for Two RR Cars . . . 28
Bi-Metallic Pistons 34
Steel and Wood Car Floor . . . 55

191 Items in This Issue

John F. Chapman, *Publisher* — **Harry S. Wharen**, *Editor* — **Joseph A. Cohn**, *Assistant Editor*
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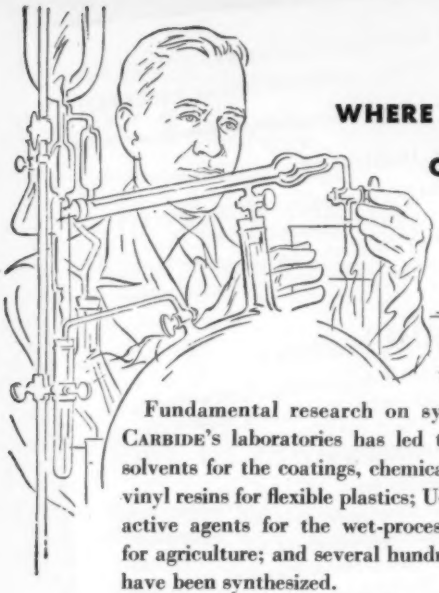

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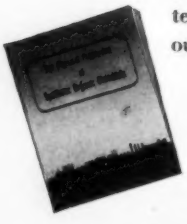

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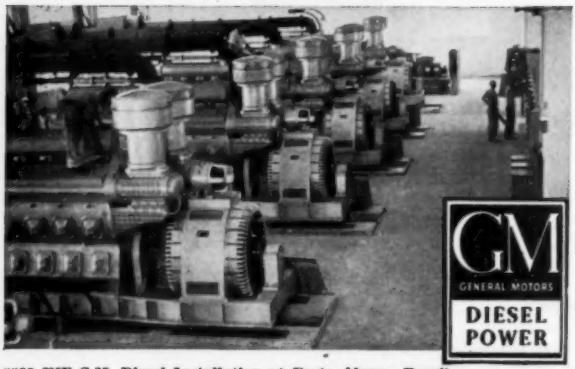

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Business Trends

ECONOMIC CONTROL ORDERS are beginning to roll out of Washington, but they have made little headway against inflationary pressures. First controls—restricting credit for installment purchases and mortgages, and limiting business inventories to "working minimums"—had no immediate effect on the rising tide of prices.

U. S. is now in the second phase of inflation. First stage—panic buying and hoarding, the swift upsurge in raw material prices—has run its course.

Now organized labor is getting wage increases of 8 to 15 cents per hour. Automobile industry started the wave by giving immediate, voluntary cost-of-living increases. These wage increases are putting a floor of permanently higher costs under the prices increased in the first stage of inflation.

Prices reflect the two stages. After Korea, wholesale prices jumped almost 7% in 8 weeks. Raw materials—chiefly imported commodities—led the parade. But prices of manufactured goods moved up with the averages.

Wholesale prices are going up about 1% a month. The rise is slower, but fairly steady. Manufactured goods are moving up almost as rapidly. And the cost of living—prices of consumer goods—is also going up.

The rising tide of defense production will bring the third stage of inflation. That will come early in 1951. By then government spending for military needs and for overseas military and economic aid will be up 50% from its pre-Korea level. And it will be rising rapidly. By late 1951, this spending is likely to reach the $50-billion level.

Defense production at that rate will cut heavily into output of civilian goods. Civilians will be getting no more than 85% of the U. S.'s total production, compared with 96% late this year. Meanwhile, rising employment and higher wages will give Americans much more cash. The result—a gap estimated at $30-billion to $35-billion between civilian's demand for goods and their supply.

To meet this inflationary surge, Washington will clamp on full wage and price controls. As official Washington is thinking now, little will be done with serious controls until well into 1951. But, by then, inflationary pressures will force broad controls. Prospects are for a steady but creeping expansion of controls over production and prices in the next 6 months.

U. S. INFLATION is turning the dollar shortage into a dollar surplus. As U. S. prices rise, foreign producers are finding their American market able to absorb even more goods.

Countries producing raw materials are benefiting most. Domestic sources of primary materials were stretched even before Korea. Since June, prices have

Business Trends (Continued)

skyrocketed; in 2½ months the rubber price rose 95%, wool 50%, burlap 48%. Sales to the U. S. will be limited chiefly by available supplies.

At first, U. S. inflation helped Western Europe by cutting into the dollar gap. But America's world-wide search for raw materials is squeezing competing buyers. Increases in raw-material prices are adding an estimated $250-million to Europe's annual imports.

The rise in import prices has spread U. S. inflation to Western Europe. France has been hit hardest. The government in August announced retail price rises for bread, milk, and other cost-of-living items. Other countries will follow.

Rearmament will make European problems worse. It will require sacrificing recent economic advances. Defense planners would like a minimum of 40 new divisions on the continent. These divisions can only be manned and equipped by reducing production for civilian use.

Europe's investment and export programs will be cut. The $4-billion in extra military aid voted by the U. S. Congress will reduce the cutback, not prevent it. Exports are expected to fall 20% by the middle of next year. Biggest drop will come in metals and engineering lines; they will convert to munitions.

NEW U. S. AID PLANS show a basic shift in American policy. New design is to tie together administration of military and economic aid, Point Four, and propaganda—"The Voice of America."

Future aid will be more closely controlled by the U. S. Past programs have usually kept politics and economics separate. Now the U. S. will attach political and economic conditions to some of its grants. In others, American officials will supervise spending to be sure the money is used effectively.

Greece is an example of how the new program is expected to work and how ECA officials guided efforts. An integrated program of military, economic, and political action has brought striking recovery there. In contrast, the U. S. has poured $695-million into the Philippines with no over-all program or purpose. Results: little evidence of progress toward recovery.

New direction on aid is toward Asia. The Far East alone will get several hundred million dollars next year. Total for all U. S. economic assistance for Asia is estimated at $2-billion for 1951. That includes private investment.

New policies for controlling aid will be applied in Asia. Conditions attached to grants will include requirement of internal reform, particularly in land, tax, and agricultural policy. Experience in Formosa proved this is the best way to make aid work. Technical help to farmers, combined with land and tax reform, paid big dividends there in a few months. Type of conditions attached to grants will be determined by reports of U. S. missions now in Asia.

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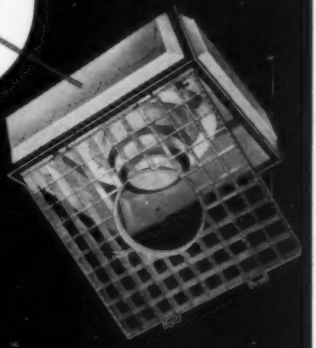

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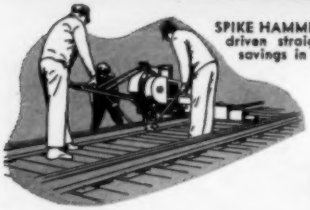

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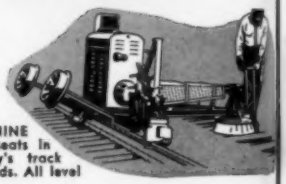

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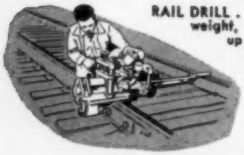

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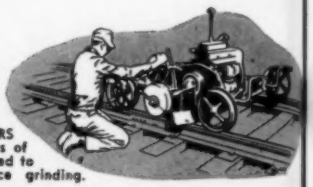

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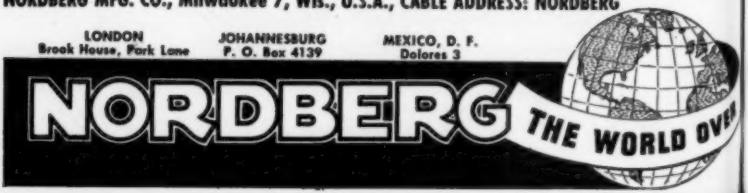

Washington Report

TO PREVENT WORLD WAR III, the U. S. will be spending up to $50-billion a year by the end of 1951. The program is open-ended; no official can say whether it will last 2 years, 5 years, a decade, or longer. That is up to the Kremlin.

Two objectives lie behind this program:

- To leave the Russians no opportunity to miscalculate the chances of winning a third world war.
- To give Western Europe the will to defend itself.

First objective is based on the assumption that you cannot compare Stalin and Hitler too closely. Korea proved that the Russians were willing to risk World War III to gain their objectives. But Washington officials still believe that Stalin based his attack on evidence that the U. S. would be neither willing nor able to react. The U. S. did. And the U.S. will react to other Koreas wherever they may happen. Washington believes Stalin will calculate more carefully before launching any more Koreas.

Second objective is based on the all too evident fact that defeatism in Western Europe, specifically in France and Western Germany, is now the number one headache for U. S. policy makers.

The U. S. cannot possibly match Russian strength man-for-man. The State Dept. realizes that air-power arguments do not impress Western Europeans much. They will be on the receiving end of bomb loads in almost any war.

So U. S. policy rests on its ability to deter the Russians before they attack—to show the Kremlin the extent of the counter blow the U. S. can deliver even if Red troops overrun most of Western Europe in the initial stages of any war they may start.

CABINET CHANGES point up the fact that the U. S. still expects the military decision with Russia to be made in Europe.

Defense Secretary Marshall's appointment means U. S. military commitments in Asia will be kept to a minimum. Marshall decided in 1947 that the U. S. could not afford to commit enough men and materials to save Chiang Kai-shek. He certainly will be of the same mind in regard to other Asian adventures now.

Marshall's appointment greatly strengthens Secretary of State Acheson's hand in Asian policies. Acheson's aim is to line the U. S. behind India's Prime Minister Nehru. That means accepting the fact that Communists now rule the mainland of China.

Navy Secretary Matthews' pending departure is the natural follow-up to Defense Secretary Johnson's resignation. Matthews served as a mouthpiece for the fringe element in Washington that talks of "preventive war." You can be

Washington Report (Continued)

sure that no responsible official believes that any war will be prevented by a "preventive war" undertaken by the U. S.

COMMODITY AGREEMENTS—call them cartels if you want—are going to be pushed for many raw materials vital to the West's defense effort.

A wool agreement may come first. World wool consumption has confounded the experts since the war. Disposal of some 3.5-billion lb. of wool, stockpiled by Britain and the U. S. during the war, failed to keep prices down even before Korea. Speculation on defense buying sent prices to phenomenal levels at the opening of the Australian auctions in August.

International Wool Study Group laid the groundwork for an allocation scheme in London last month (October). Before producing countries will allocate their clips at fixed prices, they want (1) a price-floor under the wool market and (2) import controls by consuming countries. The U. S. seems ready to go along.

A tin agreement is taking shape in Geneva now (note: Tin Group meeting began Oct. 25). Negotiations for an international tin agreement have been brewing ever since the war. The U. S. up to now has objected. Defense needs promise to change that.

Rubber will be a difficult problem. No rubber agreement will mean anything without Indonesia's participation. But the Indonesian government has shown no hurry to kill the short-run boom in profits from a 50¢ a lb. rubber price.

Other metals, cocoa, and fibers may need some form of international control, too. But chances are controls will come slowly. Each commodity promises to present a long problem. In the last war, Britain and the U. S., through the Combined Raw Materials Boards, were able to dictate terms relatively easily. Nobody else was in a position to disagree. Now there will be many to consult.

And leaving as much commodity business as possible to private trade is still a prime U. S. objective. It is an expensive business to return commodity buying to private hands after government has taken over.

PROPOSAL TO FORM a permanent United Nations trade policy branch out of the 44 nations making up the Geneva Agreement on Tariffs and Trade (GATT) will soon be made by U. S.

GATT was supposed only to be a temporary body, meeting until ITO was set up. Congressional opposition to the ITO charter has all but killed the idea. President Truman will acknowledge that soon after elections, but he will ask Congress to approve a permanent GATT executive and secretariat instead. Commodity-agreements chapter will be incorporated. Congress will probably get the request in the form of an amendment to the Reciprocal Trade Agreements Act.

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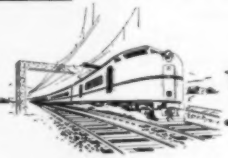
travel faster  your job

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U.S. Export Control Program

Booming business coupled with defense program now getting under way will effect exports going to your country and imports to the U. S.

THIS NEXT YEAR the U. S. government is going to have a bigger and bigger voice in the question of who gets what share of U. S. exports. That is the natural result of the huge defense build-up.

Just when export controls will go into effect in a big way, and how strict they will be, depends on the National Production Authority—the new agency set up to reshape U. S. industry for its new job. NPA has under it an inter-agency committee on export controls on which are represented the State, Commerce, and Defense Departments and ECA.

The Export Control Committee is sure to have its hands full weighing priorities of domestic needs, foreign strategic development projects, Asian and European aid programs, and the normal needs of U. S. foreign trade.

The extent of controls that will be put on U. S. production will have the biggest effect on normal commercial exports. Production cutbacks in hard-goods industries are bound to be reflected to a similar degree on the volume of exports. Priority orders to U. S. industries for military production may in some cases shut off exports altogether.

Export Control List

Materials shortages so far have brought back controls on cotton, several categories of iron and steel mill products, copper, lead, zinc, and other nonferrous metals. Secretary Sawyer has warned that the list will grow.

It may be sometime before the list gets long enough to affect the flow of experts markedly. When it does, State and ECA officials are prepared to ask priorities for European and Asian aid programs, as well as for strategic-material projects.

Before Korea, U. S. exports showed a steady decline until second-quarter 1950 figures showed them only $16-million from meeting imports. Discounting $47-million in military aid exports, U. S. exports were $727-million; imports were $711-million.

Import Barriers Topple

The advent of Korea saw many countries drop dollar import barriers to allow their traders to stock up before the expected storm. Figures, not in yet to reflect this increased demand, should be not too high.

Booming U. S. prices and uncertain delivery dates have made many foreign buyers here hesitate. Meanwhile, European sellers, who have not felt the defense push as quickly as their U. S. counterparts, have been reaping in orders by offering lower prices and long-term purchase agreements.

The export trade here in general is not taking kindly to the prospect of another bout of full-scale controls. Many exporters think it unfair to have their markets taken away in part because the U. S. is assuming a lot of Western Europe's defense load. They are urging the State Dept. to prod Western European countries to devote more of their capacity to defense.

The administration is not sympathetic to this point of view. That is particularly true among those officials at ECA who have been painstakingly spending U. S. taxpayers' money to reconstruct a workable world trading pattern. Some of these officials believe U. S. exporters should be restrained from entering third markets if defense needs prevent the Europeans from competing in them. They reason that if this does happen, it might take another Marshall Plan for recovery.

Rearmament Around the World

- **Britain stretches already tight economy with rearmament work.**
- **France faces inflation, but for business it means higher profits.**
- **Sweden needs more materials and labor to meet foreign demand.**
- **The Netherlands, already booming, readies for war production.**
- **West Germany raises exports and lowers unemployment.**
- **Italy, an exception, still worries over long lines of jobless.**
- **Brazil fears import restrictions; cutoff of foreign raw materials.**
- **Mexico gives U. S. more business, but U. S. cannot meet demand.**
- **Argentina finds business good, but fears loss of U. S. goods.**
- **Australia runs into wool-made inflation; plans wool export tax..**

THE WHOLE WORLD is feeling the effect of rearmament in the U. S. Almost everywhere it is a seller's market again. But the boom has not been good for all of business. Western Europe, in particular, is troubled by inflation. (Business Trends, p9).

As the dollar shortage ends around the world, there is a tendency for some governments that devalued currencies to think about revaluing today. However, Mexico and Australia, two of the likelier prospects, have decided against it.

Here is a report on the business outlook in ten of the world capitals.

London—Business in Britain is near the boom level. Since last year's devaluation of the pound, British export industries have had good business. But orders have come in faster than ever since Korea—so fast, in fact, that delivery dates for most products are getting longer and real shortages are showing up.

Before long, shortages of materials and labor will hold up any further expansion of production. Wholesale prices are expected to go up because of rearmament. Retail prices will follow suit. Also rearmament is likely to bring higher wages at the same time that it is checking any real rise in productivity.

Paris—This summer's war-scare inflation has definitely reversed the deflation of last spring. Both businessmen and laymen expect the inflationary pressure to mount even higher.

Nobody knows yet how fast inflation will accelerate. But the price rises of the last 2 months—before any war production started in France—are a clue. Retail prices have jumped. So far, there is no sign that productivity in industry is increasing fast enough to stem this inflationary trend.

On the average, French businessmen find the post-Korean business outlook to their taste.

Stockholm—The Swedish businessman wants just two things today—more materials and more labor. He needs both to keep up with demand. Foreign demand for Swedish raw materials probably has never been higher. Sweden has to think of the balance between import prices and export prices. Just now the balance seems to be in favor of Sweden.

Amsterdam—Until Korea came along, Dutch businessmen had been expecting a mild recession during the second half of 1950. But there are no signs of recession in The Netherlands today.

Wholesale prices are moving up sharply, following the world trend. So far, though, retail prices and most export prices have held fairly steady.

But the Dutch expect goods to become harder to obtain as rearmament proceeds. Dutch industries are now preparing for large orders and, in some cases, for full

conversion from peacetime to wartime production.

Frankfurt—A boom is in full swing in Western Germany. Exports are up and unemployment has dropped since the Korean war started. Living costs have held fairly steady.

Bonn estimates that West Germany could fill 3-billion marks worth of rearmament orders for the West. At the same time, it is expecting to boost its traditional exports to the U. S. and fill special U. S. orders.

But the Bonn government is seriously worried about two things: (1) prospects of a big increase in world foodstuffs prices; (2) German labor's recent demand for a 10% boost in wages.

Rome—Despite an over-all rise in industrial production this year, Italian businessmen tend to be pessimistic. The international situation is too uncertain. They have not found the Korean war boosting demand for their textiles or their metal working products.

Unemployment, Italy's biggest economic problem, is still as serious as ever. The most that Italian industry seems able to do is to absorb the new increases in the labor force.

The de Gasperi government hopes that more of the unemployed can be absorbed once rearmament gets under way in Italy.

Rio de Janeiro—Companies that manufacture or sell items made of local materials are getting ready for a bonanza. But firms that depend on foreign components or foreign raw materials wonder whether they will be able to build stockpiles before supplies are cut off. Traders who handle foreign manufactures, especially consumer goods from the U. S., are really pessimistic. They face the prospect of continued import restrictions, plus rising prices in the U. S. (U. S. Export Control Program, p17).

Mexico City—Business has been so good in Mexico this summer that some Mexicans have wondered if the government might not raise the peso's value.

Mexican businessmen are placing large orders in the U. S. in the hope of getting goods before export restrictions are clamped on. But home offices in the U. S. cannot supply the demand.

Buenos Aires—Argentine businessmen do not like the kind of boom they are having now. Business may be good, but the future seems completely unpredictable.

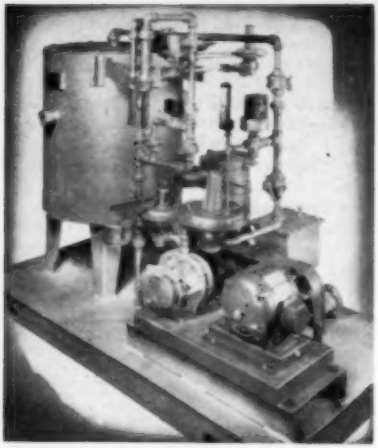
In come cases, management is even cutting down its labor force. This is partly because of the government's policy of making wage increases retroactive.

Rearmament in the U. S. and in Europe has increased the desire for American goods. The Argentine consumer fears they will become scarce if industrial conversion in the U. S. goes much further.

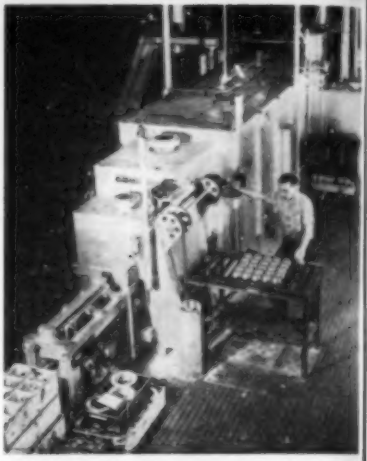
Melbourne—There are two news items that can upset Australians even more than the prospect of a large Kremlin move—a report that the wool price has collapsed and a report that wool has gone on a rampage. Since Aug. 28, wool has been on the rampage. (Washington Report, p13). Money from wool coming into the Australian economy inevitably sends prices upward.

It is this threat of inflation that has halted the upward revision in the value of the Australian pound. What is being planned is a 20% tax on wool exports. Proceeds of this levy will be used to subsidize domestic wool consumption at June price levels. They also could form a stabilization fund when wool prices fall.

A similar levy is planned on zinc and lead exports, although domestic consumers are subsidized already by producers. Though confident that these export taxes will help stem inflation, government economists are not sure that they would not be passed on to foreign buyers. They worry, too, that the subsidy may keep Australian consumption at artificially high levels, thus reducing the country's exportable surpluses.—Business Wk, Sept 23, p121



ENDOGAS GENERATOR produces a 20%-40% endothermic atmosphere for carbon restoration



CARBON RESTORATION can be combined with either hardening or annealing operations

Carbon Restoration for Steel

Restoring original carbon content of outside surfaces of parts and tools is done under furnace atmospheres of proper dewpoint

DON'T THROW AWAY those steel parts and tools that have a soft skin. You can save them by restoring the original carbon content of the decarburized surfaces by proper heat treatment. On some jobs you can even combine carbon restoration with hardening or annealing.

Here are the five steps that you take to restore carbon *up to the carbon content of the rest of the part:*

1 **Determine decarburization depth** so the time required to restore the carbon can be estimated. This can be done by (a) microscopic or macroscopic examination, (b) hardness survey if the part is hardened and tempered, or (c) actual carbon analysis of successive cuts taken from the surface toward the core.

In making microscopic examinations, it is important to study the thermal history of the part. In as-quenched or tempered conditions, decarburization depth can rarely be determined accurately. Partial decarburization cannot be seen. Hence, the piece should be cooled slowly to get a pearlitic structure.

Air cooling may be too rapid for thin sections or deep-hardening steels. Cooling rate should not suppress ferrite formation.

A hardness survey will give an accurate estimate, provided that the normal carbon content is not over 0.70%. Hardness is not sensitive to carbon in higher ranges.

Carbon analysis gives the most precise determination. It provides a carbon-gradient curve as well as the decarburization depth.

2 **Select restoration temperature** according to these factors:

(a) Time available for recarburization.

(b) Grain growth.

(c) Limitation of the atmosphere.

(d) Use of a thermal treatment in conjunction with carbon restoration.

To reduce treatment time, the recarburization temperature should be as high as grain growth, other thermal treatment, and atmosphere available permit. Grain-coarsening temperature of the steel should not be exceeded.

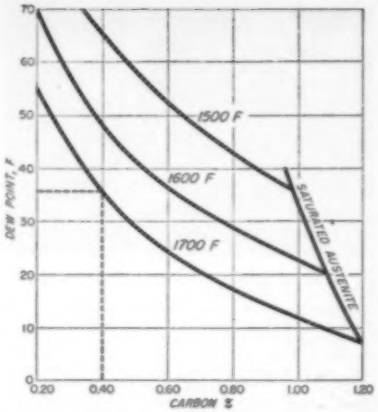
Atmosphere limitations must be considered. With a "20-40" type atmosphere (20% CO and 40% H_2), lowest dewpoint conveniently available is about −4°F. (The dewpoint, or water-vapor content, of the furnace atmosphere determines its carbon potential.) As the lower limit in the furnace may be above this value, temperature may have to be lowered so the dewpoint is 5 to 15°F.

When hardening or annealing is to be done, the temperature may be selected to make such treatment possible. Carbon restoration below 1400°F. is not practical.

3 **Regulate atmosphere** according to (a) surface carbon content desired and (b) total carbon necessary. The first factor and the temperature fix the dewpoint. The second factor fixes the amount of CH_4 to be added to the base gas.

The 1-1.5% CH_4 usually found in the generator atmosphere is enough for charges with relatively small surface areas. For large charges of small parts, it may be necessary to add a few percentages of CH_4 to the base gas. Amount necessary seldom exceeds 4-6%.

4 **Prepare charge** by freeing steel of scale. Pieces should be loaded so that the atmosphere will have free access to all decarburized surfaces. Placing the charge in the furnace as quickly as possible prevents rapid purging of oxygen and water vapor.

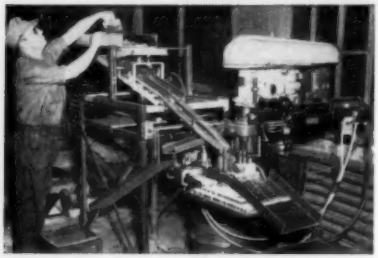


***CARBON POTENTIAL** is a function of the dewpoint of furnace atmosphere; example: SAE 1040 can be recarburized at 1700°F. without grain coarsening if "20-40" atmosphere has 36°F. dewpoint*

5 **Control furnace operation** so that the atmosphere is in good contact with the charge; if necessary, circulate the atmosphere by fan.

In continuous furnaces, carbon restoration may be made in two heating zones. In the first zone, a highly carburizing atmosphere promotes rapid build-up of carbon in the steel. Then the second zone would have an atmosphere of the finally desired carbon potential as determined in step three.

Following carbon restoration, the steel is cooled according to the metallurgical requirements for the part. If carbon restoration has been carried out in conjunction with annealing, carbon potential of the atmosphere must be adjusted carefully while the steel is furnace-cooled. A carbon potential that is correct at the annealing temperature will carburize the steel at lower temperatures, so it must be lowered as the steel cools.—Am Mach, Aug 21, p111



FEEDS CHAIN LINKS TO REAMER

Chain links made by Nordberg Mfg. Co. for ballast-cribbing equipment are punched in punch press, then reamed on this Delta drill-press. Links are fed to vertical magazines by two chutes from top tray, which is bumped by cam to move links. Air-powered feed plate then feeds two links at a time into a jig under the four-spindle reaming head. Reamed links are ejected automatically.—Am Mach, July 24, p131

In-Place Surfacing Saves Illinois Blacktop Highway

By removing the old surface and reworking it in place, deteriorated gravel and oil-mix roads can be fully and rapidly repaired—at low cost.

First, the surface is scarified to a depth of 6 in. The material is windrowed in three strips that average 3 cu. ft. per lin. ft. Then the windrow is picked up by a self-propelled loader that tows and feeds a portable hammermill. Reduced to gradation desired, material is ejected in an even windrow. The windrow is spread for oiling with No. 3 oil. The material then is mixed by the loader. As the last step the road is bladed to final shape.

In an Illinois State demonstration, a 450-ft. long by 22 ft. wide road was resurfaced in place in 3½ hr. Equipment was an Athey Force-Feed Loader and Portable Breaker combination teamed with a No. 12 motor grader.—Const Meth & Equip, Sept, p78

Solvent Extraction Recovers Salad Oil from Rice Bran

Continuous solvent extraction of rice bran provides rice oil plus improved cattle feed. The oil is stable, does not become rancid, and is satisfactory for salad dressings and cooking. The bran, sold as cattle feed, can be stored with less danger of rancidity.

The process was designed by Allis-Chalmers Mfg. Co. and is in use at American Rice Growers Cooperative Association's Houston plant. Capacity is 50 tons of bran per day with production of 15,000 lb. of crude oil.

Bran that has been removed from rice grains enters the extractor at top. Hexane, the solvent, flows countercurrent and picks up oil from the bran. Spent bran is removed at the bottom, passed through a classifier and dryers, and packaged.

The solvent-oil mixture from the top of the extractor is filtered in a leaf-type press where all traces of bran are removed. The clear filtrate is then heated to 180° F. and passed into a flash tank where 95% of solvent flashes off. Remaining solvent is removed in a bubble cap vacuum tower, leaving a clear rice oil.—Chem Eng, Sept, p123

Gives Quicker Insect Count

Worm and insect contamination of raw foods can now be detected in one-quarter to one-sixth the time needed for the Wildman technique. The new method also is simpler, gives a more efficient recovery of contaminants, and provides a more accurate count of contaminants.

The method, developed at the Oregon Agricultural Experiment Station, substitutes for the Erlenmeyer flask a specially-designed separatory funnel. The funnel eliminates the time-consuming horizontal travel of oil globules in the Erlenmeyer flask and separates pulp and oil efficiently.—Food Ind, Sept, p4

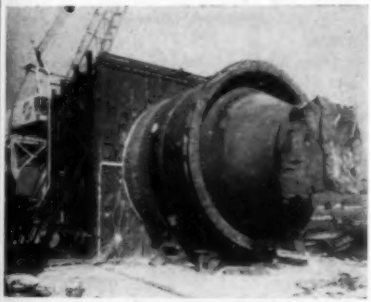
Slagging Problems Solved in Wood-Waste Boiler

Burning wood waste from salt-water-borne logs causes the sodium to pass through the furnace in the form of a sublimate and condense on the cooler surfaces of boiler and superheater. This layer of slag forms a dry, powdery coating, but succeeding layers remain in a semi-molten condition and act as a bond to hold particles of flyash to tubes.

As slag builds up, it bridges between tubes and blocks gas passages. If the slag is allowed to accumulate and the boiler cools, the slag forms a hard vitreous substance difficult to remove from tubes.

At the new steam plant at British Columbia Pulp & Paper Co., precautions were taken to prevent this condition. The two wood-waste furnaces were made with a large proportion of black surface and an idle pass to cool the gas so as to reduce slagging of boiler passes. Additional access doors were installed, and tubes were spaced to discourage bridging and to aid internal cleaning.

Also, to burn the flyash completely, combustion-chamber turbulence was assured by throat design and air in sufficient quantity is admitted through pinhole grates in the bottom of the chamber. —Power, Sept, p74



STRESS RELIEVING BIG TANK

Welded petroleum-coking vessels, 80 ft. long and 17 ft. in dia., were stress-relieved at A. O. Smith Corp. by a "portable" furnace. The furnace, which was 22 ft. long, 22 ft. wide, and 24 ft. high, had to be moved five times to cover the whole tank length. Lined with 2-in. thick firebrick and heated by 12 gas burners on each side, it held 1250° F. for 2½ hr. Rock wool packed around vessel and hung over cone manway reduced heat loss.—Weld Eng, Aug, p17

Corrugated Citrus Box

Large-scale tests of a new corrugated shipping container for oranges are under way. Fiberboard for the container is specially treated to retain strength and rigidity under damp conditions and to provide a fungicidal atmosphere for preservation of the fruit.

The board is given its moisture-resistant rigidity by the impregnation of the corrugated medium with molten sulphur by a method developed by the Institute of Paper Chemistry.

Fungicidal properties are imparted by surface application of a waxy substance called Phenodor, a decay-retarding compound.

The treated corrugated carton may find application in other fields where high compression and high humidity mean failure to ordinary fiberboard containers. —Mod Packaging, Aug, p98

Bridge 22 Floors Up

The 22nd floor of each of two adjacent buildings is occupied by the Electrolux Corp. It takes time and effort to go down 22 floors in one building, across to the other and up 22 floors again.

A steel and aluminum bridge was designed to bridge the gap between the two buildings. Most of the bridge was shop fabricated and then hoisted into place. One end of the bridge is fastened to the spandrel beams of one building. The other end rests on rollers to accommodate building sway.—Const Meth & Equip, Sept, p52

Power Press Handbook

The first hundred pages of this 717-page Bliss handbook covers the four major classifications of sheet-metal working—blanking, forming, drawing, and squeezing. This section also includes die layouts, formulae, recommended procedures to select the proper press, pressure-capacity charts, and extensive tables.

The second section describes and illustrates the range of Bliss presses, and the third section the features and operation of die cushions. Press operation, maintenance, and parts lists are covered in an extensive section. An included glossary should make the handbook particularly useful overseas where nomenclature may differ.

The handbook, priced at $7.50, is published by E. W. Bliss Co., 19 East 47th St., New York 17, N. Y., U. S. A.

How to Maintain Condensers

These practices to keep condensers in good operating condition are followed by Consolidated Edison of New York:

1. Circulating water is treated with chlorine to remove algae accumulations that impair heat transfer efficiency of tubes.

2. Coating inside tubes is removed with inhibited solution of 0.5-2% hydrochloric acid. Both sides of condenser are cleaned with the acid.

3. Tube inlet ends are coated for 5-8 in. with a protective cement to reduce erosion and cavitation.

4. Tubes with worn inlet ends are fitted with inserts made of metal or metal and fiber. Inserts are 5-12 in. long. —Elec World, Sept 11, p132

German Slab Shear Avoids Common Shear Troubles

Positive slab control, no depressing of table back of shear, quick release of sheared slab portions, and unobstructed access to shear throat are advantages of new slab shear developed by Sack Machinery Co., Dusseldorf, Germany. The machine is open-side, up-and-down-cut type.

With shear in place for cutting, the lower knife slide is retracted slightly below level of roller tables. To shear, the lower slide rises far enough to lift the slab a slight distance off the rollers.

Then the top knife slide descends to bring the clamping gag to the slab. The lower slide and gag both rise and carry the slab with them while the upper slide remains stationary.

The upward motion continues until slab reaches the top slide, the knives meet, and the cut is made. The cut is clean and square as the slab is always held at right angles to the shearing plane.

One machine installed in the U. S. has 700-ton capacity and can cut 12x12-in. blooms and 40x3½-in. slabs. It operates at 17 cuts per min. on smaller slabs and 7 cuts per min. on larger slabs.—Steel, Aug 21, p100

New Oil-Well Explosives

Three new solid explosives are gaining wide use in oil-well shooting. Results show they are safer, as effective, and more economical than nitroglycerin.

Two of the explosives, labeled S.O.W.E. No. 1 and EL-431-A, are in the form of cylinders 1 ft. long. They are wrapped in waxed paper with one wrap of aluminum foil for moisture protection.

The other explosive, S.O.W.E. No. 3, is particularly useful for hot, deep wells. It is faster and more expensive than the first two explosives. All three are made by Du Pont.—Oil & Gas J, Aug 31, p62

MECHANICAL HOLE DIGGER, mounted on International truck is self-powered, has a derrick that enables two men to set 70-ft. poles, can lift 8,000 lb., and is handy for other jobs.

Line-Construction Shortcuts

Pole replacement and tree trimming always face public utilities. Portland General Electric Co.'s methods save $50,000 a year.—Elec West, Aug, p63

INDUSTRIAL MONKEY has reduced tree trimming to small fraction of former cost. Hydraulic piston boom has cage on end from which pneumatic pruning tools are operated. The cage is insulated from the boom.

WOOD CHIPPER works in conjunction with tree trimmer. Made by Fitchburg, it disposes of limbs up to 6 in. dia. Chips are blown to side of road or into truck for hauling to company's wood-waste fuel pile.

New Metal Powders Permit Variations in Technique

Special powders for powder metallurgy are now available from Vanadium-Alloy Steel Co. They are completely alloyed before delivery.

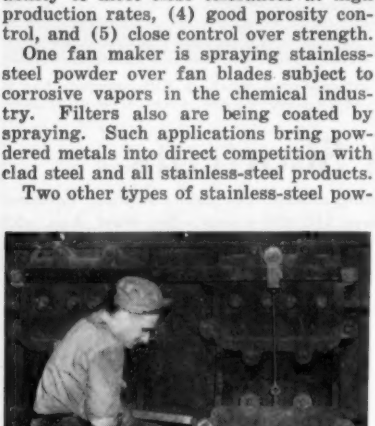
The desired alloy of iron or steel is made in a melt. A pencil-thin stream of the molten mass is powdered by blasting it with fine jets of water.

Advantages offered by the prepared powders are: (1) little or no material waste, (2) minimum machining, (3) ability to meet close tolerances at high production rates, (4) good porosity control, and (5) close control over strength.

One fan maker is spraying stainless-steel powder over fan blades subject to corrosive vapors in the chemical industry. Filters also are being coated by spraying. Such applications bring powdered metals into direct competition with clad steel and all stainless-steel products.

Two other types of stainless-steel powders are made by the American Electro Metal Corp. One consists of 86% iron and 14% chromium; the other of iron plus 17-18% chromium and 8-9% nickel.

They can be sintered at low temperatures, have good moldability, and do not require high-purity atmospheres. Strength before sintering is three to ten times higher than that of other commercial powders of similar composition. —Prod Eng, Sept, p89



MORE SAFETY, LESS LABOR

Poor handling of condenser doors caused injuries. So New York City Transit System installed a trolley to save manual lifting of door and to remove hazard. For inspection, worker removes nuts from door, swings it away from bolts, and then rolls it to one side by means of trolley. Upper door in picture need not be removed for inspection.—Power, Aug, p113

Textile-Mill Fluid Drives

Smooth starting and uniform acceleration to full speed are essential for good processing performance on many types of textile machines. A fluid drive assures this.

The initial torque of the coupling is zero; and because of the gradual increase of speed, there are no shocks or impacts to gears, rolls, or any driven part. Load and speed variations are reduced because of the equalizing and shock-absorbing ability of the coupling.

Fluid drives will permit use of direct-motor drives on many textile machines where objections to abrupt starts prevented their use. Elimination of shafting, pulleys, and belting with direct drives reduces cleaning and safety hazards.—Textile World, Sept, p133

Oven-to-Home Pie Pans

An inexpensive, one-time-use pie pan of aluminum foil makes it possible to form, bake, and deliver to the consumer without transfer to paperboard plates.

Foil thickness is 0.003-gage. Certain adjustments on the automatic pie-make-up machines was necessary. Special runners for the plate rim were installed. Die mesh was altered to compensate for the thinness of the foil plate. Four suction cups pick up four plates at a time and drop them into the dies of the machine.

Advantages are: (1) lower fuel costs, (2) production of a pie with a thinner crust, (3) improved appearance, (4)

elimination of purchase of original set of tin pie plates, (5) elimination of two operators to wash pie tins, (6) elimination of cost of washing powder, (7) elimination of paper transfer tray.—Mod Packaging, Aug, p77

Effect of Outlet-Air Bleed On Jet-Engine Operation

The problem of bleeding air from the turbine-compressor outlet for miscellaneous services has troubled designers of engines, aircraft, and accessories.

Considerable quantities of compressed air may be required for operation of current and future turbine-powered planes, for such uses as cabin pressurization and conditioning, protection against ice formation, and boundary-layer control.

A report by the U. S. National Advisory Committee for Aeronautics outlines the results of research in this problem.

In general, bleeding air from the compressor outlet of an axial-flow turbojet decreases thrust by slightly more than double the percentage of bleed and increases the specific fuel consumption slightly less than double the percentage of bleed for rated turbine-inlet temperature operation.

Decreasing the turbine-inlet temperature or increasing compressor-inlet temperature increases the effect of air bleed on engine performance because of reduction in turbine-inlet temperature ratio.—Aviation Wk, Sept 11, p36

Watchmen Start Production

Watchmen at American Optical Co. start production machinery so that it will be ready to go at 8 a. m., when manufacturing operations begin. If the operators had to do it themselves, it would cost the company $3,000 annually in lost production time. If the watchman finds one of the machines he is supposed to start out of order, he calls the proper repair man to repair or adjust it before 8 a. m.—Factory, Sept, p113

LARGEST PLASTIC SHEETS CAST

Advertising beacon is formed of the largest colored plastic sheets ever cast. The beacon is 18 ft. high and tapers in width from 8 ft. at the top to 3 ft. at the bottom. It is a shell of yellow translucent acrylic, 0.187 in. thick, mounted on a frame of 2-in. angle irons. All exposed metal is stainless steel. Lighting elements are enclosed within the shell.—Mod Plastics, Aug, p64

Extrusion-Coated Electrodes

A British firm, Murex Welding Processes, Ltd., is now making aluminum welding electrodes with an extrusion-coated flux. Advantages of the new electrodes include:

- Reduced spatter.
- Readily controlled arc.
- Overhead welding possible.
- Easily removed slag.
- Coating more stable.—Prod Eng, Sept, p156

Machines Can Crush Ice for Two RR Cars per Minute

Highly mechanized facilities for icing refrigerator cars have been installed by the Denver & Rio Grande Western Railroad. Facilities provide for storage, 3,600 ft. of low-level loading platform, and two loading machines. The loading machines break the ice to the size needed for each car and mix in the required amount of salt as the ice goes into the car bunkers. It is possible for one of the two self-propelled machines to ice cars at the rate of one per minute.

Conveyors are provided throughout the system to handle the cakes of ice. Two ice crushers on each machine produce any size of ice down to a fine snow.

Adjustable chutes deliver the ice from the crusher to the cars. One chute is designed to deliver ice on the track adjacent to the icing machine track, while the other reaches across the ice dock to cars on the track beyond.—Railway Age, Sept 16, p48

More Pork, More Eggs

Here are two ideas that work for the farmer:

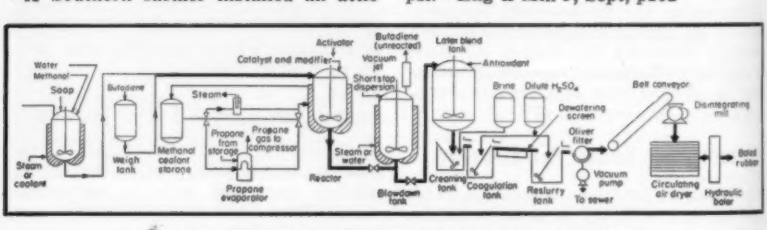
• A Southern farmer installed an attic fan in a large pig pen because hot weather kept the pigs from eating and gaining weight normally. The fan was installed at one end of the pen, and a 4-in. layer of sand was spread over the floor and wetted down a couple times a day. Air blowing over the wet sand lowered pen temperature by 15°. Result: pigs gained 1 lb. a day in July and 2 lb. a day in August and September.—Elec World, Aug 28, p116

• U. S. Dept. of Agriculture scientists have discovered that ultraviolet light makes hens lay more eggs. Natural light was excluded from the hen house. Egg output went up 19%.—Elec World, Sept 11, p101

Use Compressor Waste Heat

Three 215-cu. ft. per min. compressors in the Schramm, Inc. plant deliver 400,000 Btu. per hr. into a system suitable for space heating or process heating.

The air-compressor cooling water is circulated through unit heaters mounted in various parts of the plant. The cooling water picks up heat from both the compressors and jackets of the engines. Heat recovered by this system is 1,280 Btu. per hr. per cu. ft. per min. of compressor capacity for air delivered at 100 psi.—Eng & Min J, Sept, p102



MAKES SYNTHETIC RUBBER WITHOUT STYRENE

New synthetic rubber—polybutadiene or PB rubber—is made without critically short styrene (McG-H Digest, Sept, p57). Butadiene is mixed with soap and polymerized at 86° F. in a reactor cooled with methanol. Reaction takes 10-12 hr. Material is blown down under vacuum, and latex is blended with antioxidant, creamed in brine, coagulated in dilute H_2SO_4, dewatered, reslurried, and filtered. Then it goes to disintegrating mill, air dryer, and hydraulic bailer. Latex is mixed with high-abrasion furnace carbon black before conversion to solid rubber.—Chem Eng, Sept, p107

REDESIGN GIVES BETTER LOOKS, FEWER PARTS

Improved appearance and lower manufacturing cost are results of a redesign of Tricolor Corp's coffee-maker by industrial designers Cushing & Nevell. The new utensil has five major parts, needs only one self-tapping screw and one assembly operation.

The old design had 12 major parts, needed 8 rivets and 10 assembly operations. Price of old design was 50% higher than new design. One major saving was made by spinning the aluminum top; appearance too is much better.—Prod Eng, Sept, p100

New Resins Speed Building of Molded Plastic Boats

Plastic-impregnated boats are being made in production quantities at the Beetle Boat Co. They range in size from 8 ft. to 24 ft. and include powerboats, outboards, rowboats, and dinghies.

A 24-ft. cruiser can be turned out in a day—compared with 4-6 weeks when wood or metal is used. What was once a laborious hand job is now speeded up with polyester resins. Their advantages include fast curing without pressure and a minimum of heat.

Fiberglas mats are sliced into patterns with power cutters. Then the patterns are laid over a female mold and sprayed with polyester resin. Four to 15 layers of mat are used, depending on the strength required.

A catalyst is added to the resin before spraying. The catalyst causes heat. This starts hardening the resin, and the structure stiffens. Now the deck structure can be lifted and placed over the hull structure (built the same way). The two are "glued" together with additional resin.

The hull-and-deck unit is then allowed to harden at room temperature. Next it is baked for several hours at 200° F. The "flash" or excess at the joint is trimmed off, and the boat is ready for fitting out.—Business Wk, Sept 16, p52

Desert Bridge Deck

California highway engineers are considering wide use of a system of redecking desert road bridges with steel panels.

Objectives of the work are: (1) replace a wooden deck with a more permanent type; (2) do this at a minimum cost with minimum labor; (3) develop a system whereby half the deck can remain in use while work on the other half is under way.

Individual panels are all-welded, then bolted together to form the deck. Stiffeners are welded to the deck at regular intervals.

Because of the dry climate, little or no painting will be required.—Eng News-Rec, Aug 31, p44

This House is Insulated . . . ***This House is Not . . .***

Insulation—Why, Where, How

Insulation is a vital factor in man's search for comfort. These principles assure adequate protection from weather and economical temperature control

HOME DESIGNERS AND BUILDERS in all places and climates require insulation as an added item of livability and comfort in the new houses produced. Insulation is used in cold climates to make home heating comfortable and economical.

Why Insulation Should be Used

Assume that a residence is of frame construction with walls of wood siding, building paper, wood, and plaster. The over-all heat transmission value is 0.26 Btu. per hr. per sq. ft. of wall surface per deg. temperature difference. If, however, a 2-in. thick mass insulation is added, the rate of heat loss becomes 0.09 Btu. or a saving of 0.17 Btu.

Assume that the net wall area to be insulated is 1,000 sq. ft. This would make a saving of 170 Btu. per hr. per deg. temperature difference. Suppose that the building is located where the average outside temperature during the heating season is 35° F. The heating season extends from Oct. 1 to May 1, or 5,088 hrs. Heat saving, therefore, will be 170 times 35 times 5,088 or 30,273,600 Btu. per heating season.

Assume that coal is the fuel with a heat content of 13,000 Btu. per lb. and an over-all efficiency of 50%. Then 13,000 divided by 0.50 is 6,500, and 30,273,600 divided by 6,500 equals 4,657 lb. of coal or 2.33 tons that can be saved in a heating season. Multiply this by the cost per ton of coal and you have an emphatic reason why insulation should be used.

How Insulation Works

Function of insulation is to keep walls, ceilings, and floors resistant to the escape of heat from indoors and to keep the in-

door surfaces of rooms at a temperature of the air in the rooms.

Transfer of heat through building materials takes place almost entirely by conduction. Heat always moves from the warm to the cold side.

Practically all mass insulations are made of porous, lightweight materials. They are formed with millions of air pockets or voids in them. Each tiny air cell tends to retard heat flow. Tests have indicated the most economical results are obtained with about a 2-in. thickness of mass insulation.

Where to Insulate

There is no established formula specifying where insulation should be used.

There are three ways of retarding the passage of heat by the use of insulating materials: (1) by replacing materials having a high rate of heat conduction with materials with a low rate of heat conduction, (2) by adding insulating materials to the wall to partially or completely fill the air space, (3) by applying a reflective insulation to one or both surfaces of the air space.

In determining where to insulate in a structure, the general rule to follow is to insulate the walls, ceilings, and floors immediately surrounding the area to be heated in cold weather. Floors of rooms above open or unheated porches and garages should be well insulated in addition to all wall and top-floor ceiling areas.

Type of Insulation and How to Install

Suitable insulation should be selected and if best results are to be obtained, careful application of the materials is essential.

Loose Fill—Fill insulations are bulk materials usually packed in bags. Mineral wool, wood fiber wool, and vermiculite are the most imporptant types.

Appplication of granulated-type fill insulations is simple. The material is poured from bags or blown between framing members. Loose fill should be poured between ceiling joints to a depth of about 4 in. It may be poured in place as soon as the plaster base or interior finish is applied.

When granular or fiber insulation is applied to existing structures in the side walls, a check should be made to determine if there are any obstructions to the insulation flow. It is important that walls be completely filled to the top, along with all the openings below fire stops and windows.

Blankets—Felted or wool-like blankets are of three types: (1) those having the fibers completely encased on all sides with paper, one side a vapor barrier, (2) those having a vapor barrier on one side and not fully encased in paper, (3) those having no paper covering.

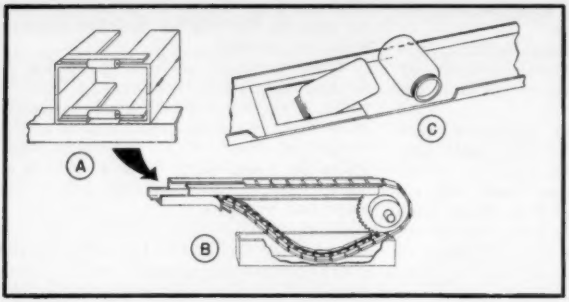
Two efficient methods of applying blanket insulation in frame construction are: (1) between the framing members held in place by friction, (2) between the framing members with nailing flanges or edges of the paper or vapor barrier backing nailed to the inside edges of the framing members.

In applying all types of blanket insulation, there should be no openings through which air can move from the air space on one side to the air space on the other side.

Insulating Board—The outstanding characteristic is that it combines structural strength with insulating qualities. When applied, insulating board is usually the finish wall. It can be nailed directly to studs or any solid backing. Nails should be ⅜ in. from the edge and about 3 in. apart around the edge.

Reflective—This type of insulation depends on its surface characteristics for its insulating value. Reflective insulation must be used with at least a ¾-in. air space.

Reflective insulations are manufactured to be installed either between framing members or with nailing surfaces brought over the inside edges of the framing members and the reflective surface set in between the members.—Am Builder, Sept, p75.



HOW TO IMPROVE YOUR CONVEYORS

Here are details on three improvements for your metal flat-top chain conveyors: (A) Weld four angle irons to form a sturdy, rigid guide. (B) Pass slack chain through trough of soapy water for continuous lubrication. (C) Cut rectangular slot to discharge sliding jars automatically. —Food Ind, Aug, p57

Induction Hardening Arbor Cuts Bearing Cycle Time

Two automatic screw machines at General Motors' Saginaw Steering Gear Div. turns bar stock into completely machined bearings and also hardens them. A universal-joint bearing is produced in 2 min. 16 sec.

The screw machines, which are standard 1¼-in. 8-spindle automatics, are each fitted with an induction coil and quench chamber on an arbor. The heating power unit is a 450,000-cycle oscillator-type unit rated at 20 kw.; it supplies power alternately to the two heating coils.

The quench arbor is mounted on the tool slide at the sixth station and moves in and out of the bearing in a precisely controlled cycle. The arbor is cam-driven. The cam moves the coil into position rapidly, then holds it stationary during the hardening cycle.

A special cam welded to the end of the spindle operates a limit switch to start the hardening cycle. The switch energizes a timer to turn on the power to the coil for the specified time and then energizes a solenoid to open the quenching-oil valve.

The new method eliminates the copper plating, carburizing, tempering, and grinding necessary in the conventional method. Also it reduces floor-space requirements, gives closer control of hardness pattern, and reduces manufacturing cycle from several hours to a few minutes.—Iron Age, Aug 24, p65

Nylon Teasel Brushes

Installations of nylon-bristle teasel brushes in two woolen mills have proved them to be a superior replacement for teasel burrs.

Minimum expected life of the brushes is 2 years of continuous service without repair or replacement. No change was found necessary in before-or-after treatment of the cloth from that used in regular teasel gigging. The cloth in many cases could be gigged with the nylon-bristled brush in fewer runs and in a shorter time than with the natural teasels. A more consistent finish was obtained, and gigging streaks were eliminated. Shorter runs were possible in many cases.—Textile World, Sept, p125

Bearing Lubrication Study

Performance of ball- and roller-bearing lubrications are checked over a wide temperature range in a grease-testing machine developed by The Texas Co. to simulate actual service conditions.

During the test, grease samples are observed under high-speed stroboscopic light to determine changes in quality,

consistency, texture, and color. Also revealed are aeration and leakage tendencies and breakdown from heat and prolonged use.

High-speed motor-driven shaft in the machine operates a shielded bearing encased in an electrically heated oil bath, regulated from room temperature up to values above 300° F.—Aviation Wk, Sept 4, p24

How to Control Losses In Wood-Room Operation

Paper-mill managements have paid too little attention to wood-room operations, which as a result have been sources of steady losses.

Development of the Weyerhaeuser whole log hydraulic barker was a spectacular step in the right direction. Savings made have amounted to 18-20%. Since then, a hydraulic barker for small round wood and a hydraulic slab barker have been developed.

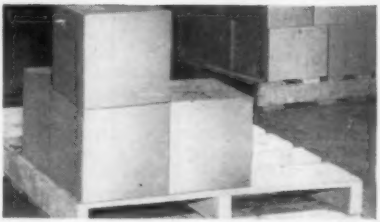
Much unnecessary cleaning is still being done by knife barkers, knot borers, wood peckers, beavers, and knot saws. Wood losses from this equipment can mount to 30%. Proper supervision can cut this loss in half. Some sulphite mills have stopped hand cleaning in the wood-room.

Another factor closely connected with wood-room losses is stream pollution. Fines can be kept from the stream by screens, then burned after pressing.

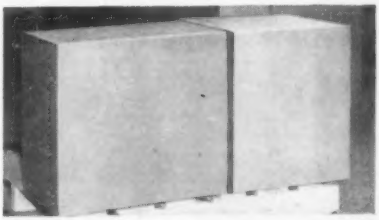
Control of sawdust reduces wood loss. Dull knives increase sawdust by one-third. Conditioning and adjustment of the bed plate is often neglected. Multiple-knife chippers help, especially when operated at or near capacity. A test run with such a chipper gave 1½% sawdust at 20 cords per hr. and 1% at 50 cords.

A rapid method of chip analysis should be provided for chipper-room foremen. Sawdust quantity should be produced on a graph to make it easier to watch trends. —Paper Ind, Aug, p528

Pallet Load Is Only As Good As the Product Container



PERFECT CUBE CONTAINER will not make a stable load. These cases will not allow overlap stacking that will "tie" the layers together and thus distribute bearing loads.



DIMENSIONS WILL NOT FIT a standard pallet properly. These containers are too large. A two-tier load would be above the maximum desirable height of 72 in.

PERFECT LOAD is proportioned for overlap stacking in a cube, fitting standard pallet with over-all dimensions suited to freight car or truck.—Mod Packaging, Aug, p86

How Maintenance Improves Operation of Loopers

Menders, developed in looping operations, can be reduced by preventive maintenance of machines. Major overhauls occur when the dials need repointing. Worn parts are replaced where necessary.

Preventive-maintenance program at Spalding Knitting Mills is thorough but requires little time. There are a daily and a weekly check and a complete cleaning and oiling of all moving parts.

The daily check does not need to be in detail because of the thoroughness of the weekly inspection. During the weekly inspection, the looper is cleaned and oiled; adjustments of the trimmers, needles, chain clippers, lint brushes, and gears are made.

The main operation of the daily inspection is the cleaning of the lint brushes. Occasionally light oiling with a high-speed machine oil is needed.

The program includes sending sample menders to the looping-department foreman, who classifies the causes and then makes proper machine adjustments.—Textile World, Sept, p129

MOTORIST WINDS METER

When a motorist parks his automobile alongside this meter, made by Red Ball Parking Meter Co., he also must wind the clock. Levering the coin into the machine winds the mechanism and sets the correct time on the dial. Clock operates only when meter is in use. If motorist parks overtime, a red ball pops up into the open top.—Prod Eng, Aug, p103

Locating Shunt Capacitors

Shunt capacitors improve a plant's power factor. Maximum benefit comes from placing capacitors near low power-factor loads, but that practice may not be the most practical.

Combined cost of small banks is greater than the cost of one large bank of equal total capacity. Also, because of diversity of loads, fewer capacitor units may be needed in a large bank than in a number of scattered small banks.

Another disadvantage of small banks is the excessively high voltages they can produce during periods of light loads. This calls for automatic switching. So the choice must be weighed against these three factors—cost, voltage rise, switching.

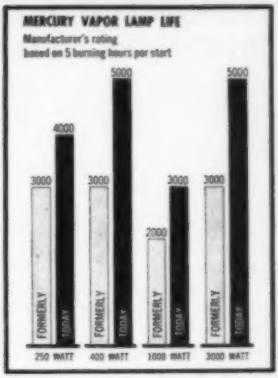
Possibilities are to install a group-capacitor bank on the high-voltage side of a primary substation, to place capacitors on the load side of switches that control low-power factor loads, or to connect them on substation lines.—Power, Sept, p102

Bi-Metallic Pistons

The bonded bi-metallic piston combines the advantages of the cast-iron piston with those of the aluminum piston. A bi-metallic piston is an aluminum piston with a cast-iron insert for one or more piston ring grooves.

Differences in coefficients of expansion of the two metals caused bond failure. This problem has been solved by using high-nickel cast irons with high coefficients of expansion.—Fleet Owner, Sept, p54

FLEXIBILITY is important in obtaining desired amount of light exactly where and when it is needed



HIGHER EFFICIENCY and longer lamp life are shown graphically here

Today's Lighting Equipment

A well lighted plant or office may mean increased production with lower costs. Today's lighting equipment can be easily adapted to any need

FILAMENT LAMPS have reached a point in their development where radical increases in lumen output can be had only at the expense of shorter life and greater cost. However, advances have been made in other directions.

Spot and floodlights have been made more efficient. Hard, heat-resisting bulbs stand contact with water without breaking. Internal reflectors resist discoloration and make maximum use of light output.

Research on fluorescent lamps has brought increases in light output and performance. More efficient phosphors are available. Better, longer-life cathodes have been developed. Changes in the inert gas mixtures have contributed to greater lumen output per watt of power supplied.

Good design of ballasts has decreased electrical losses and improved voltage regulation. Better starters now contribute to lower maintenance and replacement costs.

Much has been done to improve the efficiency of reflectors used with all types of lamps. The trend is now toward deeper shielding. Various forms of louvers and covers provide better quality lighting under different conditions.

Today's reflectors make maximum use of the light the lamps produce. More efficient lamps and reflectors may mean less lamps are needed for a given installation. And that means money saved.

Today lighting equipment can be adapted to each need. There are units that can be mounted individually or in long, continuous rows. Vertical surfaces as well as horizontal can be illuminated.

Mercury-vapor lamps have been improved to the point where the light is nearly white. Twin fixtures, combining mercury vapor and incandescent lamps, are available.—Factory, Sept, p98

Fire-Fighting Hints on Dry-Chemical Extinguishers

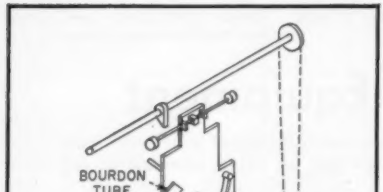
Dry-chemical fire extinguishers can put out fires so fast it seems like magic. But they are designed to fight only certain kinds of fires.

Chief ingredient is sodium bicarbonate chemically treated to repel moisture and flow freely When sprayed on a fire by gas pressure, the soda breaks down into carbon dioxide and steam. These gases smother the fire.

Dry chemical is for liquid, gas, grease, and electrical fires only. It can put down flames of fires of wood, paper, and such materials, but cannot extinguish deep-seated embers. Such embers must be quenched and cooled with water. Neither should it be used on small fires on delicate electrical equipment, because the powder insulates contacts and must be cleaned off.

Here are tips on how to use dry chemical:

- For pipeline fires, aim right at the leak.
- Attack burning paint on building sides at bottom and work up.
- Shoot chemical over entire area of textile lint fires so it settles onto both flame and unburned cotton.
- For heavy-equipment fires, use intermittent bursts rather than a steady stream.—Oper Eng, Sept, p24



CONTROLS BOILER COMBUSTION

Control system, developed in England, has a Bourdon tube indicator calibrated to respond to boiler pressures of 100-105 psi. Vane extending into light path causes light to reach phototube from either lamp 1 or 2 as pressure changes. Signal energizes relays on motor, thereby controlling dampers, fan speed, or stoker feed.—Electronics, Sept, p176

How Mine Roof-Bolting Increases Efficiency

Boone County Coal Corp. has found that roof-bolting raised tons per man in mechanical mining 55-100%.

Low coal of varying thickness and a wide range of roof characteristics called for a learn-as-you-go bolting program. In a duckbill section, 1-in. bolts were set by hand, 3x10x24-in. wood blocks were used as caps to support the clod, and nuts were tightened by hand. Quantity of top material handled was reduced to zero. Production per crew man was increased 75%.

In the shuttle-car section, electric drilling with a special drill mount produced about a 100% increase in production. Bolting with electrical drilling equipment in a five-heading entry where top slate had been handled raised the tons per loading unit 55%.

Holes are drilled 1¼ in. for split-rod-and-wedge bolts and 1⅜ in. for expansion shells. Bolts 36 in. long are being used in the top split, where the top is being suspended from the stronger strata. In the bottom bench, where a definite beam action is secured, bolts are 42 in. long.—Coal Age, Sept, p74

MACHINING CYCLE is all automatic as . . .

Electronic Robot Boosts Lathe Output 700%

An electronic robot, increasing output of manually operated machine tools by as much as 700%, was recently demonstrated by Arma Corp. Operation of robot does not require skilled labor.

The new electronic control is pictured above at right. Operation is as follows: Electrical contacts actuating electronic servo-motors are made and broken by the punched hole pattern in the paper roll. The servo-motors drive, in this case, the lead screw and cross feed of the lathe.

In this manner, the machining cycles of lathes, jig borers, grinders, and other manually operated tools can be made fully automatic.

Increased output comes about from (1) higher speeds attainable, (2) no interruptions for measuring and blueprint references, and (3) far fewer rejects.—Iron Age, Aug 3, p73

Iran Attacks Malaria

The first phase of an extensive malarial-control program in the Shiraz Valley of Iran has recently been completed by a team of American technologists assisted by Iranians. Over 145 towns and villages, embracing a population of 220,000 people, have been sprayed with DDT.

Three technologists from Pennsalt International Corp. and Dr. H. R. Roberts from Academy of Natural Sciences not only completed the first definitive entomological data on malaria vectors of the area, but also trained Iranian teams to continue the program. Sponsor of the project is the Iran Foundation of New York.

Anti-malaria measures will continue until the Shiraz Valley is cleared of the disease.—Chem Eng, Sept, p184

New Plant's Bus Circuits Give Layout Flexibility

High accuracy demanded at Greist Mfg. Co., manufacturer of aircraft, automobile and sewing-machine parts, make high-intensity, glare-free lighting necessary. Also, the wiring system in the company's new plant had to be readily adapted to plant changes and expansion.

Power is supplied at 2,400-volt, three-phase, three-wire, 60-cycle primary. Three 150-kva. transformers convert power to 240-volt, three-phase secondary. A three-bus, low-reactance bus duct delivers power to main switchboard.

A power network feeder system delivers energy from switchboard to load centers. Feeders consist of 225-, 400-, and 600-amp. three-bus, low-reactance bus ducts. Two-core air-type transformers of 15 and 25 kva. are installed at strategic locations to supply 120/240-volt single-phase power to lighting branch circuits of bus plug-in and to polarizing outlets on all columns.

Lighting installation consists of continuous-row, porcelain-enameled-reflector, four-lamp fluorescent slimline luminaires on 10-ft. centers. All lamps are 4500° white.

Initial lighting level was 101 ft.-c. After 6 months, illumination was held at 80 ft.-c. in both low-bay and high-bay areas.—Elec C&M, Sept, p50

Technical Shorts

Underground Mine Radio—Two-way radio communication system uses trolley lines as carrier cables in Canadian Johns-Manville mine. Radio impulse is projected from the sending set and is picked up by the trolley line. Then it is picked from the trolley line by receiving sets on the surface.—Eng & Min J, Sept, p97

Cylinder Block Brazed—Aluminum water-cooled cylinder block made from coreless castings brazed together has been developed by an automobile manufacturer. Brazing is done with brazing-compound strips with melting point 200° F. below that of aluminum.—Am Mach, July 24, p79

Salt-spray Test—Small aircraft motors at the Westinghouse Corp. are exposed to a continuous salt spray, although they may never get such rough duty in actual service. Test determines what materials and designs can withstand salt water best.—Aviation Wk, Sept 4, p25

Use Your Salvage—Solar Aircraft Co. uses most of its salvage material by advertising it. Material conservation board displays samples of all sizable pieces of scrap from stainless-steel stampings. Each piece is labeled with characteristics of material. Production men watch board and use salvage material wherever possible.—Factory, Aug, p93

Egg Shipment Damage—Shell egg damage in rail cars, when total lengthwise slack between cases is more than 2 in., is twice as great as when the slack is less than 2 in. Hay or straw buffings and wood space fillers between cases at the center of the car provide equal protection to the egg cargo.—Railway Age, Sept 9, p71

Improved Agitator Drive—By replacing a 60-hp. steam engine and line shafting with motorized fluid drives, distillery mash-tub agitator drives needed less space, less repair. A 25-hp. fluid drive was coupled to a double-reduction herringbone gear. Gear couples to a shaft with two bevel pinions meshing into an agitator bevel gear.—Power, Aug, p142

FINS GUIDE TUNNEL SHIELD

Adjustable fins on outside of a tunnel shield guided its progress through soft, fluid mud on a California sewer line. Primary function of the fins was to prevent spiraling of the shield as it was jacked through the mud. These outriggers also proved valuable in maintaining vertical alignment.—Eng News-Rec, July 27, p38

Increased Fabric Wearability—Use of nondurable aluminum salt-wax emulsion for increasing wear resistance of fabrics is not warranted for garments subjected to severe wear or severe laundering according to a U. S. Quartermaster Corps report.—Textile World, Sept, p354

Milk Pasteurized after Bottling—Reversing usual procedure, a patented process would bottle milk, then subject it to pasteurization. Bottles are held at 152-155° F. for 30 min. Method is designed to overcome the objection that contamination can and does occur in usual method.—Food Ind, Aug, p121

Cleans Venetian Blinds—Laundry in Salt Lake City specializes on cloth, aluminum, steel, or wood venetian blinds. Blinds are placed on conveyor belt, sprayed by detergent bath, rinse-sprayed, and dried in infrared oven. No dismantling is needed.—Elec West, Aug, p80

Two-conveyor Setup — "Almost-continuous" mining has been achieved with a variation in conveyor use. Places are driven 60 ft. wide and a room conveyor is laid on each side. Half the face is cut and then loaded by a crawler machine onto one of the conveyors. Then, the other half is cut, the two machines alternating back and forth.—Coal Age, Sept, p83

Colored Highways—Motorists will see red and black while driving on the new Calumet expressway near Chicago. Turn-off lanes and ramps will be finished in those colors to distinguish them from through-traffic routes. Red-dyed concrete and black top will be used.—Eng News-Rec, Sept 14, p19

Heats Combustion Furnace—Electronic combustion furnace for carbon and sulphur analysis of iron and steel is heated by r-f. induction. Frequency is 10 mc. at 500-w. power output. R-f. coil surrounds atmosphere-sealed tubing containing sample.—Electronics, Sept, p160

DOUBLES DOCK CAPACITY

So that trucks hauling heavy tools can unload and take on cargo from either end of material dock, Barnsdall Oil Co. built this permanent hoist runway. Pictured arrangement was preferred instead of two or more davit cranes because no heavy anchor is required to support equipment. Six modified A-frames, with horizontal cross pieces and knee and sway bracing, are used. Trolley rail is supported by U-bolts.—Oil & Gas J, July 20, p107

More and More Plastics—New Crosley refrigerator has 24 lb. of plastic in 68 different parts. Largest plastic part is 6-lb. phenolic door liner. Other plastic parts—shelves, shelf rails, butter safe, freezer door, meat keeper, crispers, even a nylon roller in the latch mechanism.—Prod Eng, Sept, p98

Greek Power—Ebasco Services, Inc., and Greek government have signed a 5-yr. contract under which Ebasco will manage a nation-wide electric power system in that country. Development will cost $200-million. ECA is helping finance the program. Authorized projects include 163,000 kw. of capacity.—Elec World, Sept 11, p102

Tile Floors—Green asphalt-tile floors have been found excellent in stamping plant that makes small precision articles. They are easily kept clean, are resilient and therefore comfortable for workers, and are cheaply repaired.—Am Mach, Aug 21, p151

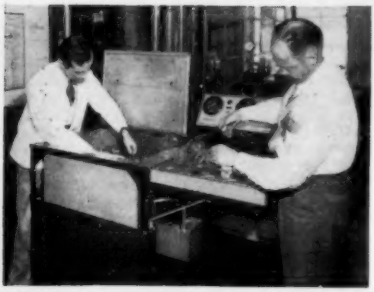
Wood-waste Board — Wood substitutes made of wood waste and urea formaldehyde are being used in increasing quantities by the building industry in England in place of ordinary plywood. Demand for densified woods is increasing. They are used for bearings and brushes in paper mills.—Mod Plastics, Sept, p146

World Oil Production—New all-time high was reached in June for world production of crude oil. Output was 10,438,000 bbl. daily—6% over May of this year and 15% over June 1949. This is the first time output went over the 10-million-per-day mark.—Oil & Gas J, Aug 24, p99

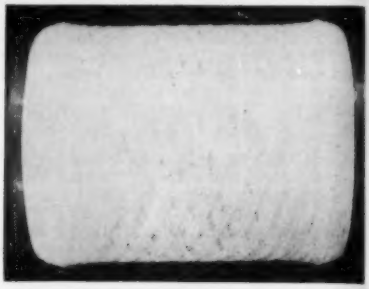
Service School Is Mobile—A full line of working parts and cutaway models of R. G. Le Tourneau, Inc., equipment is carried in a specially built trailer. School is going to all distributors to provide maintenance and service instruction.—Const Meth & Equip, Sept, p102

Longer-life Pallets—Wood pallets last three times as long if steel strapping is applied over top of pallet boards and around runners. It keeps nails from pulling loose, prevents splitting of boards at nail holes, keeps pallets rigid, and holds boards tight to runners.—Ceramic Ind, Sept, p76

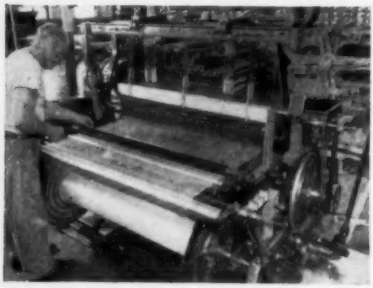
These Machines and Processes . . .



LAUNDERING CHARACTERISTICS of cellulose-acetate yarns and staple are being tested



PEANUT-PROTEIN FIBER spun at the SRRL is not degraded by color from peanut skins



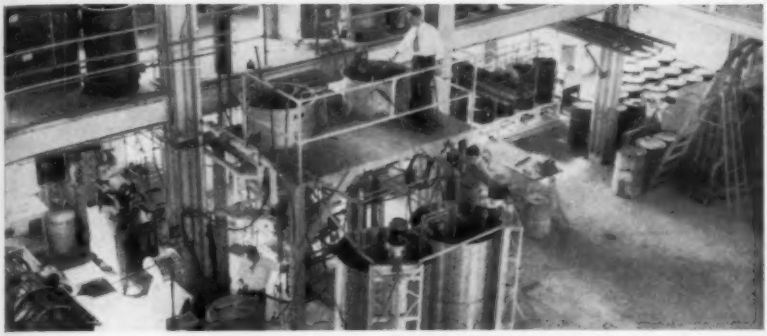
EXPERIMENTAL WEAVING of Fiberglas yarns is done on both wide and narrow looms

"THERMOSOL" PROCESS for dyeing Orlon drives color into dyed fabric by means of heat

CORONIZING UNIT changes the hand and extends the useful life of the cloth

CONVENTIONAL JIGS can also be used with some dyes on both Orlon and Fiber V

. . . Help Develop New Textile Fibers



PROTEIN PILOT PLANT at the SRRL evaluates peanut, cottonseed, and casein proteins

Synthetic-Fiber Progress

There are thousands of fiber-forming materials, but only a very few are practical. The most promising new and improved fibers are discussed here

AT NO TIME in textile history have so many different synthetic fibers been under development at one time. Actually, there are thousands of fiber-forming materials. Over 99% of them are no good because of poor properties or excessive costs to produce today.

Here is a summary of what some of the fiber and chemical companies are doing:

Du Pont Rayon Division—Production of Orlon (acrylic fiber) was started this year. The present type is expected to be used primarily in industrial fabrics.

The continuous-filament now being produced can be dyed to light shades with selected acetate and basic colors. Orlon acrylic staple produced in experimental quantities can be dyed to produce shades possessing excellent fastness to light and wet treatments.

Fiber V is described as a "condensation polymer obtained from ethylene glycol and terephthalic acid." It is of interest because of high tensile strength and resistance to stretching, chemicals, abrasion, and wrinkling.

Celanese Corp. of America—Greatest concentration of research and development is on cellulosic rayon. Celanese is also doing work on dyestuffs and dyeing techniques.

Research and development of the manufacture of staple fibers—both acetate and the new Celcos fiber—has resulted in improved tenacity, elongation, finishing, and workability. Celcos and acetate have been developed for use in floor coverings.

Developments in the manufacture of Fortisan, the super-strong yarn, have continued. The Quartermaster Corps has lined special garments with it.

American Viscose Corp.—Emphasis seems to be on improvements of existing viscose staple and a new type of plasticized Vinyon staple, Vinyon HH.

Avisco 15, a 15-den. chemically crimp-

ed rayon staple, has been developed especially for use in rugs.

Viscose has dropped production of polyethylene monofilament yarn and is discontinuing its Vinyon filament yarn, although continuing its production of Vinyon staple.

Carbide and Carbon Chemicals Corp.—Dynel staple is now in commercial production. Dynel is acrylonitrile-vinyl chloride staple. Techniques for fiber processing, fabricating, dyeing, and finishing have been improved. The staple is much easier to dye than the filament yarn.

Southern Regional Research Laboratory—A spinning machine of commercial-scale capacity has been installed at the SRRL for the production of peanut protein fiber. Woven textile fabrics composed of blends of the fiber and rayon or wool have been evaluated.

A new soluble cotton fiber was recently developed at the SRRL. Produced by a special chemical treatment, it disintegrates when washed in soapy water or other weak alkali solutions.

The cottonseed protein fiber process has been improved. An acid treatment prevents the tendency of the protein to jell when being spun. Additional research is needed, particularly to improve the color, before the fiber can be considered for production.

Owens-Corning Fiberglas Corp.—Developments are more on protective coatings, handling, and uses than in basic fiber changes.

Coronizing—the 1200°F. heat-treating of Fiberglas cloth—has widened the uses of glass-fiber fabrics. After Coronizing, special finishes can be applied, thus adding flexibility not heretofore available with glass fabrics.

Fiberglas-staple yarns are being produced in limited quantities. These yarns are, in effect, twisted sliver. Staple can be spun into finer yarns but requires equipment and techniques different from those used with cotton, wool, or rayon.—Textile World, Sept, p92

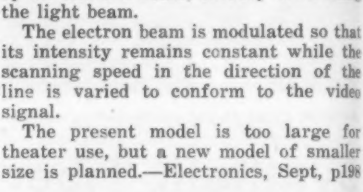
Swiss Theater Television

Polytechnical Institute of Zurich has developed an electromechanical accumulation process that shows promise for direct-projection theater television on full-size screens.

Light from an arc passes through a slit system, then through a thin, transparent metallic electrode coated with a viscous liquid, through a second slit system, and finally to the screen. The electrode surface is mechanically deformed by an electron beam, thereby controlling the light beam.

The electron beam is modulated so that its intensity remains constant while the scanning speed in the direction of the line is varied to conform to the video signal.

The present model is too large for theater use, but a new model of smaller size is planned.—Electronics, Sept, p198



MIRROR SAVES FOOTSTEPS

Only one operator is needed at this roller leveler. He feeds the auto-fender blanks at General Motors' Chevrolet Div. through the leveler. A stacking fixture behind the leveler lines blanks up for easy removal. A mirror over the machine lets operator check stack without moving from feeding position. —Am Mach, Aug 21, p128

GIANT GEAR RECUT IN PLACE

A lot of planning and ingenuity were needed to correct the tooth stagger of this 380,000-lb. gear. It was recut in place in 14 days. A 10-ft. dia. indexing wheel spaced each tooth and the opposite stagger tooth to keep cutting error within practical limits. Dial indicator mounted in combination with index wheel kept accurate check. The heavy gear was rotated tooth by tooth by a hydraulic jack.—Power, Aug, p105

More Steam, Lower Cost

More steam for its ironers, pressers, tumblers was the problem at Independent Towel Supply Co., Pittsburgh. The two underfeed-stoker-fired boilers could develop only 11,000 lb. of steam per hr.—much below peak demands—and pressure reached only 60 psi. instead of the 100 psi. needed.

As building changes had to be kept as small as possible and the new plant had to go into service fast, a packaged steam generator was picked as the best proposition. A 14,000-lb.-per-hr. gas-fired Cleaver Brooks boiler was installed. It has a forced-draft fan to supply air for combustion.

Results were good. Fuel savings amount to $200 a month. The new boiler meets all demands easily. Maintenance is low. Boiler-room help has been switched to other jobs. Gas firing is clean and gives the flexibility needed when steam demand drops suddenly.—Oper Eng, Aug, p24

Fresh Water Carves Salt To Make Storage Reservoir

First man-made underground storage reservoir for propane and butane was carved out of a salt bed by injection of fresh water. The project, engineered by Hydrocarbon Storage Co., Inc., was carried out at the Sid Richardson gasoline plant in Texas.

A well was drilled to within 100 ft. of the bottom of the salt bed. Fresh-water casing was set and cemented, and the casing string cemented in the hard anhydrite over the salt.

A string of 2⅜-in. tubing was run to 50 ft. off bottom, and fresh water circulated with a portable pumping unit. Salt water was removed through the casing. Circulation was reversed occasionally.

Propane was stored by pumping it into the casing, thereby displacing water from the bottom. Pumping water into the bottom of the reservoir recovered the propane from storage. Recovery was 96½-99%.

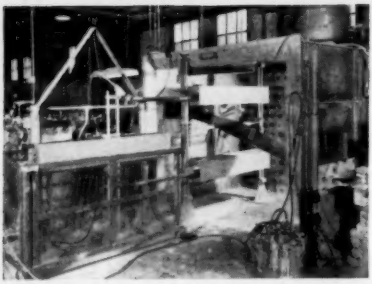
The 7,500-bbl. reservoir cost less than $2.50 per bbl. of capacity, compared to $15 per bbl. for steel tankage.—Oil & Gas J, Aug 17, p59

Coal Recovery From Sludge

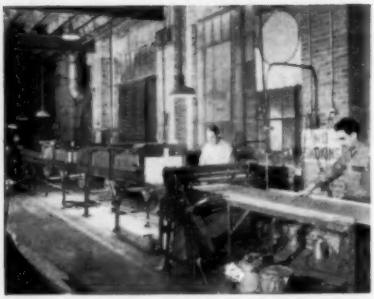
Here are the major items of equipment needed to make sludge recovery a profitable operation: (1) a drying plant with hot-air supply, (2) a pit-loading unit, (3) enough haulage trucks to keep the dryer busy, and (4) an oil storage tank with heater and spray.

Officials of the Peabody Coal Co. found it best to confine "mining" of the sludge pond to the center area where ash content and moisture are manageable.

A louver, cascade dryer (Link-Belt) is fed raw sludge at 40° F. The dryer discharges the coal at 120° F. into an enclosed conveyor. After the coal is loaded for shipment, it is sprayed with about 18 gal. of heavy oil.—Coal Age, Sept, p84



SPRAY GUNS reciprocate across moving steel strip to apply ground coat to both sides



MASONITE BOARD is fed through a roller coater to apply adhesive, then infrared dried

ENAMELED STEEL is applied to coated Masonite and passed through pinch rolls for bonding

New Porcelain Wall Facing

A new kind of history for porcelain finishes is promised by unique process that faces Masonite with coated steel

COMPLETELY NEW porcelain-enamel building product is being made by Baltimore Porcelain Steel Corp. It is a wall facing of porcelain-enameled steel bonded to Masonite backing.

For interior use, the back of the Masonite board is roller-coated with a special sealer to prevent moisture penetration. For exterior use, the back of the Masonite is faced with 28-gage galvannealed steel for the same purpose.

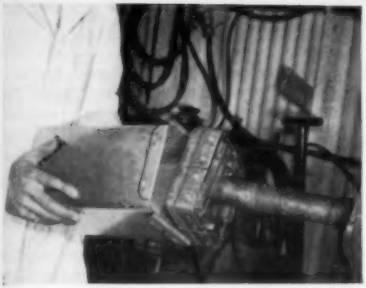
The steel is enameled in a continuous operation. Coiled strip, 24-in. wide, is bought already pickled. It is supported by rollers through processing.

Uncoiling from the roll, the steel first passes through a nickel sulphate bath and a dryer. Then it passes between two spray guns that apply ground coat to both sides of the sheet, through an electric furnace for firing, between two more spray guns that apply cover coat, and through another firing furnace. The strip is sheared to required size sheets.

The Masonite is prepared by applying an adhesive with a roller coating and passing the board through an infrared dryer to evaporate excess solvent from the adhesive. The steel sheet is applied to the coated Masonite, and the two are bonded thoroughly together by passing through pinch rolls.

The finished product is 24 in. wide and 4, 6, 8 or 10 ft. long. It has many applications, both in the home and commercial enterprises.

In the home, it may be used in the bathroom, kitchen, rumpus room, and work shop. In business places, it makes a colorful, easily maintained, long wearing surface.—Ceramic Ind, Sept, p72



INERT ARC WELDS BEVERAGE CONTAINERS

Two-gal. stainless-steel containers to hold hot beverages on United Air Lines' planes were made of 0.020-in. sheet. Drawing in one piece would have been too expensive for small number needed. So container bottoms only were stamped. Container body (left) was placed on fixture with copper back-up plate. Then bottom is welded (right) to body by inert-arc process. Back-up plate keeps inside smooth.—Weld Eng, Sept, p17

Continuous Hygirtol Process Makes Low-Cost Hydrogen

Hydrogen is made from propane by the Hygirtol process at Lookout Oil & Refining Co.'s Chattanooga plant. This process, developed by Girdler Corp., produces 99.75-99.95% pure hydrogen on a continuous basis. It is more economical than electrolysis.

Propane and steam are reacted in a furnace (with nickel catalyst) to produce a mixture of hydrogen, carbon monoxide, and carbon dioxide. The hydrogen is purified in three stages, each consisting of converting CO to CO_2 and removing CO_2 by the Girbotol process.

The mixture at 700-800° F. is passed into the first-stage converter that has two beds of iron oxide catalyst. CO is reacted with steam to produce CO_2 and H_2.

From the converter the mixture goes through a gas-to-gas heat exchanger, gas cooler, and the first-stage absorber. In the absorber a monoethanolamine solution absorbs the CO_2. The gas passes back through the heat exchanger, then to the second-stage conversion. After second and third stages are completed, the hydrogen is dried in an Electrodryer and sent to storage.

The monoethanolamine solution passes through the three absorbers in series, then to a reactivator where absorbed CO_2 is expelled by heat and recovered for use as an inert gas.

Capacity of the plant is 150,000 cu. ft. of H_2 per 24-hr. day. It needs only one operator per shift as the entire operation is controlled from a centrally located control panel.—Chem Eng, Sept, p104

Jet-Action Dishwasher

New automatic dishwasher operates with what is called "jet tower" washing action. A square tube with 64 holes extends up the center of the tub. Water is forced through the holes, revolving the tower and forcing water over dishes in surrounding baskets. Spinning creates a brush action on dishes, forcing the dirt downward. The machine, made by Mullins Mfg. Corp., completes a wash and two hot rinses in 9½ min.—Elec Merch, Sept, p139

Chemical Speeds Deglazing of Silicone-Coated Pans

Lower costs, better quality of baked goods are the result of production improvements made by Fuchs Baking Co. Among them are a special rotary cutter with special kick-out bars, a home-made nut spreader that saves $75 a day in spreading nuts over sweet rolls, and an improved method of deglazing bread pans.

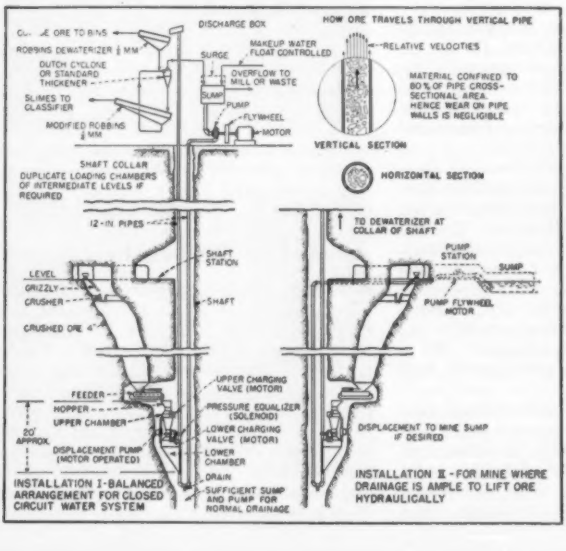
The pans are silicone-glazed. After about 290 bakes, they are deglazed by immersion for 5-10 min. in Dowanol DC, a glycol ether made by Dow Chemical Co. Former method was to boil pans in a caustic soda solution for 8 hr.

Deglazing is done in a 50-gal. insulated tank equipped with steam coil and a perforated pipe through which compressed air is directed to agitate the solution. After the glaze is removed, pans are passed through a converted automatic industrial dishwasher that rinses them with hot water.

Pans are air dried and run through the glazing machine. In the glazer, the pans are inverted over spray nozzles. They are then drained, air dried for 1-1½ hr., and baked to cure the glaze.—Food Ind, Sept, p84

Perlite for Foundry Cores

Newly suggested material for making cores for aluminum- and magnesium-alloy castings is perlite. This volcanic glass-like substance in expanded form is mixed with a binder of 11% fine rosin, 40% urea formaldehyde resin, and 49% siliceous clay. Proportions are 3-5% binder with 95-97% perlite plus enough water to make it workable. Advantages: good venting, imperviousness to molten metal, friable, easily removed.—Foundry, Sept, p144



HOISTS MINE ORE

Diagram shows two proposed mine installations of a hydraulic material lift for hoisting crushed ore. Crushed ore is fed into hopper. Ore is dropped into upper chamber through charging valve. Upper charging valve is closed. Pressure inside upper chamber is equalized with that in lower chamber. Lower charging valve is open to allow ore to settle into lower chamber. Lower charging valve is closed. Displacement pump operates, thus lowering water level in upper chamber. Crushed ore is raised to surface. P. S. Gardner, mine engineer, developed this system.—Eng & Min J, Sept, p84

Economic Use of Gas Turbines

Present types of gas turbines have economic applications in power generation where fuel is cheap, water expensive, peaking served

GAS-TURBINE GENERATORS are available now in small sizes (5,000 kw. and below). But as more operating experience is gained and as designs are improved, much larger units will be available.

A 3,500-kw. General Electric unit is now in operation on the Oklahoma Gas & Electric Co. system. It uses natural gas as fuel. Exhaust heat is employed to heat feedwater in a steam station, resulting in an over-all improvement of station heat rate and an increase in steam-turbine output.

Another 3,500-kw. unit is being installed as a peaking unit on a New England hydro system. A 5,000-kw. unit will soon be installed as a base load unit during low-water periods. Two 5,000-kw. units will be installed in Oklahoma to supply local loads at the end of long transmission lines.

To get an idea of where larger units will fit into the power-generation industry, let's look at the economic fields of application of present units.

1 Gas turbines in their present state of developmpent cannot be considered competitive with large modern high-pressure, high-temperature steam stations in either first cost or efficiency. They are competitive with other types of generating units of comparable size.

2 Present gas turbines can often show savings over steam stations of equivalent size when the same fuel (natural gas or bunker C oil) is used in both stations.

3 In areas where the cost of obtaining water is high, the gas turbine has the additional advantages over the steam station of its much lower water requirements.

4 Because of low cost and simplicity of gas-turbine foundations and housing, total installed cost and recovery value may show a distinct advantage.

5 A gas turbine using bunker C oil cannot compete on an operating-cost basis with a small steam station using coal unless the oil costs not over 10% more than the coal per Btu.

6 When both units use the same fuel, the gas turbine can compete with a diesel station in cases where fuel cost is low, such as in natural-gas areas.

7 When the cost of bunker C oil is 80% or less of the cost of diesel oil, the gas turbine can compete with the diesel at all fuel cost levels.

8 The most favorable conditions for economical applications of gas turbines appear to be:

(a) Areas where either natural gas or bunker C oil is the cheapest fuel and particularly where water costs are high.

(b) Where peaking capacity is required that will be operated only a small part of the time.

(c) Some cases where the gas turbine can be used as an end-of-line plant as an alternate to building new transmission facilities.

(d) Special applications where conditions offer advantages for recovery of exhaust waste heat.

9 Future development of a successful coal-burning gas turbine and of automatic unattended gas-turbine generating stations would greatly extend their possible fields of application.—Elec World, Aug 14, p88

New Products

Handles Kegs—Hydraulic fork-truck attachment can pick up, move, stack, and unload six 200-lb. kegs. Guide frame on unloaded accessory lowers over kegs and pulls them back against three rubber-covered shoes. No carrying plate is needed, so truck can be operated with standard forks.—**Towmotor Corp.**—Am Mach, Aug 7, p156

Oscillograph Camera—Unit photographs screen of any 5-in. cathode-ray oscilloscope with a Polaroid camera and produces a print in 1 min. No darkroom is needed. Print size is 3¼ x 4¼ in.—**Fairchild Camera & Instrument Corp.**—Electronics, Sept, p124

Tramp-iron Magnet—Non-electric Alnico magnet, for removing tramp-iron from wet or dry material, can be installed above belt or slat conveyors and in open or closed wood or metal chutes, troughs, tables, rolls, or hammermills.—**Dings Magnetic Separator Co.**—Coal Age, Sept, p118

Labeling Tape—Two sheets of acetate with a special carbon material between them form a labeling tape. Markings cannot be smudged or obliterated. Any type of writing instrument can be used. The tape will stick to practically any clean, dry surface.—**Labelon Tape Co.**—Mod Plastics, Sept, p157

Hydraulic Index Table—A 33-in. automatic hydraulically powered index table with 24-in. work circle makes possible higher speed operations and automatic feeding and ejecting on production lines. It has variable speeds for indexing rates from 10 to 70 a min. Accuracy is within 0.002 in.—**Denison Engrg. Co.**—Steel, July 31, p91

Machinist's Vise—This vise opens or closes to any position in one second through a push-pull action that eliminates spinning the handle. A turn and a half of the vise handle counter-clockwise slides the jaw in "neutral" to any position. When the work is engaged, the vise operates in a conventional manner.—**Dodge Mfg. Corp.**—Ind Dist, Sept, p136

Motors Resist Corrosion—Totally enclosed fan-cooled motors of 5-250 hp. are suitable for chemical plants, oil fields, refineries. Frame is cast iron. Stator windings are varnished, then coated with an acid- and alkali-resistant varnish.—**Wagner Electric Co.**—Elec World, July 31, p132

Steel Scaffolding—Low-priced scaffold will carry 4,000-lb. uniform load and 16,000-lb leg load. It is made from high-carbon steel tubing, welded in a rigid design. Scaffolding may be rapidly assembled or dismantled by unskilled help, without special tools.—**Safway Steel Products, Inc.**—Am Builder, Sept, p138

Electric Impact Hammer—Tool will stake, crimp, mark, bend, clinch, cut, rivet or punch. It delivers 6000-lb. punch and follows through with a 2000-lb. "squeeze" at end of stroke. Controls can be added to adjust force of blow as desired.—**Black & Webster, Inc.**—Aviation Wk, Sept 11, p44

ENGINES ARE "CANNED"

Metal containers for shipping and storing aircraft engines have been placed on the market by Alco Products. Containers are designed to protect aircraft gas turbine and reciprocating engines against extreme conditions of shipping and storing all over the world. Container prices compare favorably with wooden crates formerly used.—Aviation Wk, July 31, p21

INSULATES SCREWS

Plastic-metal screws made by Forman Insulating Screw Corp. are already insulated for electrical connections. Full-length metal core carries the torque applied by a screw-driver. Plastic screws like those shown (right) eliminate metal screws and insulators in an electric switch (left).—Business Wk, Aug 26, p44

Screen-printing Machine—Automatic machine is capable of printing ten colors at 200 to 300 yd. per hr. Repeat precision of 1/5000 in. is obtained. Cloth, fed to machine, adheres to moving rubber apron that carries fabric through printing and drying sections.—**Pioneer Screen Printers, Ltd.**—Textile World, Sept, p138

Tiny Photocell—Unit using photosensitivity of germanium is expected to find wide use in decoding punched tape, electronic computing and sorting, and operating relays. Essentially a germanium diode, photocell has sensitivity of 0.1-ma. change in current per lumen near the infrared region.—**Sylvania Electric Products, Inc.**—Electronics, Sept, p227

Collects Flyash—High centrifugal force in Regenerative mechanical dust collector removes flyash, soot, and cinder particles from moving column of gas. Unit has no moving parts, needs no power source.—**Joseph Breslove, Jr.**—Power, Sept, p144

Metallic Tubing—Electrical metallic tubing has electrogalvanized exterior finish and elastic-enamel-coated interior. Tubing is made in sizes of ½-2 in. and 10-ft. lengths.—**Spang-Chalfont Div., National Supply Co.**—Elec West, Aug, p38

Plastic Packing—Vulcanized tape-back on Super Seal spiral packings increases flexibility and makes packings easier to handle. Ring cutting is simplified because spiral can be twisted to small shaft sizes and cut into rings.—**Crane Packing Co.**—Oil & Gas J, Aug 17, p145

Injection Molder—Machine claimed to be world's largest injection molder has 21,000-psi. nozzle pressure and at one time can turn out plastic products of 200 oz. Clamping capacity is 1,000 tons. Daylight opening is 54 in.—**Watson-Stillman Co.**—Am Mach, Aug 21, p162

Dial-feed Welder—Motor-driven indexing table features projection welder designed for welding telephone part boxes. Automatic work ejector is air-operated. Capacity is 1,600 assemblies per hr. of 16-gage low-carbon-steel mounting plate welded to 18-gage part box.—**Taylor-Winfield Corp.**—Weld Eng, Aug, p46

Corrosive Acid Filler—Machine operates on vacuum principle, with vacuum being drawn by means of a Pyrex glass steam-air jet pump. Acid bottles are fed into machine on a stainless-steel conveyor. Rate of fill is about two fills per spout per min.—**MRM Co. Inc.**—Mod Packaging, Aug, p124

Steam Circulator—Addition to equipment line is steam circulator designed to speed up condensate removal and improve heat transfer in platen presses, textile drying-machine heaters, and tubular heaters.—**Sarco Co., Inc.**—Power, Aug, p148

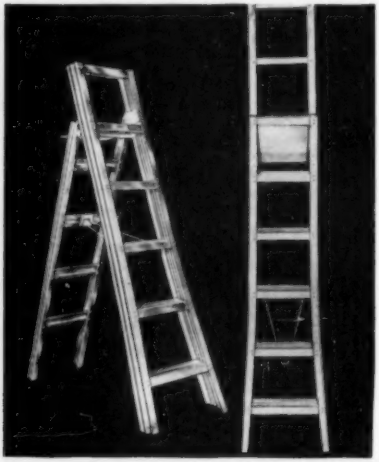
Swages Hard Steel—Material is saved by swaging machine with dies that will operate on harder and tougher steels in length-to-diameter ratios than the usual dies. Machine is claimed to reduce material requirements by as much as one-half.—**Fenn Mfg. Co.**—Steel, Aug 28, p103

New Products (Cont.)

Fast-feed Welder—Electrode wire's high-current densities make a penetrating arc, permitting high welding speeds. Unit automatically and continuously feeds 5/64-in. electrode wires through the conductor cable to the welding gun.—**Lincoln Electric Co.**—Business Wk, Sept 9, p48

Cuts Glass Tubing—Motor-driven automatic crack-off machine cuts 5-ft. long tubes to lengths of ¼-4 in. at 3,000-4,000 pieces per hr. Glass is passed through gas flame and touched at heated part by cold steel disk. Strain set up severs tube.—**Eisler Engrg. Co.**—Ceramic Ind, Sept, p120

Truck Crane—Hydra-Lift is a mobile crane that can be installed on any type truck and used with any make winch. Action is hydraulic. Boom swings to 180° and telescopes from 11 to 20 ft. Capacity is 2,500-6,000 lb.—**Pitman Mfg. Co.**—Oil & Gas J, Aug. 31, p93



DUAL-PURPOSE LADDER

Aluminum ladder serves as 6-ft. step or 10-ft. straight ladder. It weighs less than 15½ lb., can support over 600 lb. Non-skid pads on rails prevent slipping. Maker is Original Products Co.—Oper Eng, Sept, p69

Measures Vibration—Amplitude of machine vibrations is shown by oscillation of light beam on graduated scale of Model P Vibrometer. Unit is applied by holding against the vibrating machine. Scale is graduated to 0.001 in. or 0.01 mm.—**Vibroscope Co.**—Elec World, Sept 4, p29

Acetylene Gun—Gun lights and shuts off automatically by touching or releasing the trigger. This feature is designed to save fuel and time. Changeable combustion tubes give flame sizes to cover every air acetylene job. Its pistol shape fits the hand.—**Century Manufacturing Co.**—Bus Trans, Aug, p121

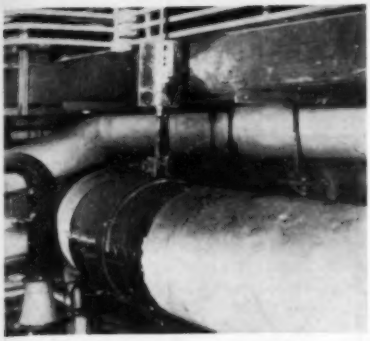
Dumping Bucket—Tip-over, self-righting dumping bucket is all welded. It is furnished in various sizes for handling foundry sand, ashes, brickbats, refuse, and other bulk materials.—**Blaw-Knox Co.**—Foundry, Sept, p231

Versatile Packer—With only slight mechanical adjustment, recently developed automatic packer can handle consumer units from 1 to 25 lb. at 180 a min. Interchangeable duckbills make it possible to package round-corner bags as well as rectilinear type cartons.—**Union Bag & Paper Corp.**—Food Ind, Aug, p92

Cable Conveyor—Closed circuit is not necessary with this flexible-screw-type cable conveyor. Loads up to 15 lb. per foot of conveyor are propelled around bends and through rise and fall at speeds up to 12 fpm.—**Teleflex Inc.**—Factory, Sept, p170

Steam Cleaner—All-electric steam cleaner mixes water with desired amount of cleaning compound and pumps mixture through a manifold where it is electrically heated. Boiling solution and vapor are ejected at 100-120 psi. and 60 gph. Portable unit weighs 800 lbs.—**Homestead Valve Mfg. Co.**—Eng & Min J, Sept, p118

Molten Metal Thermocouple—Designed to withstand melting temperatures up to 3200° F., new molten metal thermocouple for ferrous metals takes temperature readings in less than 30 sec. It has adjustable extension and uses a 27-gage platinum-10% rhodium element.—**Wheelco Instruments Co.**—Iron Age, July 20, p37



REDUCE HEAT LOSSES

Insulated pipe hanger carries main steam line at Kentucky Utilities Co. station. The 10-in. pipe has 5 in. of magnesia insulation. Hanger consists of flanged band, saddle plate, and filler bar, around which is fastened a strap for suspension by standard pipe support. Absence of direct metal-to-metal contact between hot pipe and support prevents excessive heat losses.—Elec World, Aug 28, p96

Types Statistics—Electrical typewriter with decimal tabulation is designed to speed statistical typing by use of 10 decimal tabulation keys. Typist may select any 1 of 10 digit positions in each column, automatically positioning carriage.—**International Business Machines Corp.**—Am Business, Aug, p57

Trolley or Battery Operates Tractor—Unit is designed for trolley or battery operation without the need for separate charging equipment. Battery floats on the line and is automatically charged while tractor operates from the trolley in main entries. —**Baker-Raulang Co.**—Coal Age, Sept, p114

Controls Bessemer Operation—Electronic flame control instrument enables operator to determine silicon, manganese, and carbon periods and forewarns of impending manganese boils. Dual-speed chart recorders give permanent records of air and flame characteristics.—**Whiting Corp.**—Steel, Aug 21, p117

Stabilizes Grease—Ortholeum 300, a mixture of complex organic amines, is an effective grease stabilizer that retards oxidation and deactivates metal. It is insensitive to light, is miscible in all proportions with oils and greases above 160° F., can be added in different ways, and is toxic so should be used with care.—**E. I. du Pont de Nemours & Co., Inc.**—Chem Eng, Sept, p162

Narrow Slot Guides—Precision thread guides with polished slots as narrow as 0.020 in. are available. Closer control of fine-denier yarns, faster processing, and improved quality are reported. Loopovers on ends of packages have been eliminated—**American Lava Corp.**—Textile World, Sept, p140

Processing Temperatures—Device controls industrial processing temperatures between −20° and 300° F. Sensitivity is 1/10°. Control is immune to vibration, dust, dampness. It can be used with indicating or recording instruments.—**Minneapolis-Honeywell Regulator Co.**—Paper Ind, Aug, p532

Potentiometer—Low shaft torque (0.003 in.-oz.) is a feature of this device. It converts small mechanical force into corresponding electrical voltage. Unit will carry up to 0.1-amp. current, has output sufficient to operate instruments without amplification.—**Electro-Mec Laboratory**—Aviation Wk, Aug 28, p24

Speed Reducers for 3,000 HP.—Single-and-double-reduction industrial reducers with minimum mounting space and weight savings are available. Heat-treated gearing and fabricated steel housings provide the savings. Antifriction bearings with splash lubrication are used throughout.—**Westinghouse Electric Corp.**—Auto Ind, Sept 1, p52

READER SERVICE

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New Thread Cuts Bolt Breakage

Endurance limit of bolts, studs, and other threaded fasteners is remarkably increased by new high-fatigue-resistant thread form

DEVELOPMENT of a new high-fatigue-resistant thread form points the way to fewer failures of threaded parts under repeated loads. Ordinary thread forms cause failure through notch effect, but the new thread has greater resistance to notch effect than either the American National or British Whitworth threads.

The thread, on which Bethlehem Steel Co. has filed application for a patent on its manufacture, has a considerably larger root diameter than the other two thread forms. Radius in the thread root also is greater, but provides sufficient thread engagement between external and internal threads so as to develop full strength. Increased root radius results in thread form with no pitch diameter.

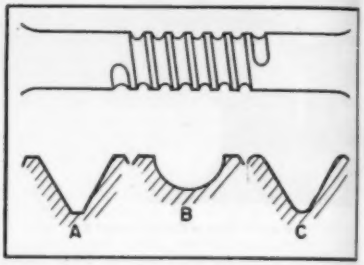
The 60° thread angle of the American National form is maintained, but thread height is materially reduced. This results from increasing the root radius to lessen notch effect.

Fatigue tests of the Bethlehem thread form were run on a rotating beam machine at 10,000 rpm. The thread form was superimposed on a modified standard test specimen.

Test specimens included American National coarse and fine and British Whitworth threads as well as the new thread. They were ground from fully normalized $\frac{7}{8}$-in. blanks of medium-carbon, open-hearth steel of 63,000-psi. yield point, 97,500-psi. tensile strength, 23% elongation, and 46.2% reduction in area.

Unthreaded fatigue specimens of this steel showed an endurance limit of 40,500 psi. The AN coarse form showed 18,500 psi., the BSW and the AN fine forms 21,000 psi. each, and the high-fatigue-resistant form 29,000 psi.

To field-test the new thread form, bolts and nuts were placed in use as the fastener holding the guard rail to the running rail in high-speed subway service. Variable stresses in this service are extremely severe because of high traffic frequency, short curves, changing acceleration, and the high center of gravity of the variable loaded cars.



HIGH-FATIGUE THREAD FORM, as shown on test specimen (upper) and in section B, has greater root diameter and root radius than American National form A or British Whitworth form C

Of several thousand bolts of mild-carbon steel with cold-rolled threads, one-half were annealed before thread rolling and the other half cyanide hardened after rolling.

After several months of service, results showed that breakage of the annealed bolts was only one-third that of the alloy AN coarse thread bolt usually used. The cyanide-hardened bolts gave still better service with a breakage of less than one-eighth of the AN coarse bolts.

In view of these excellent test results, well over 200,000 such bolts have been placed in this same service within the past 3 years. Service life has been as satisfactory as the initial test performance, contributing to considerably lower maintenance costs and fewer train delays.—Steel, Sept 4, p86

Industrial UHF System Passes Reliability Tests

Power, railroad, pipeline and other such companies are increasingly interested in point-to-point communication facilities. They are needed for voice communication, supervisory control, telemetering, load control, protective relaying, and allied uses.

Because of crowding of low-frequency spectrum, Westinghouse Electric Co. has developed uhf. radio equipment with seven voice channels for this purpose. It operates in the 940-960 mc. band, having a signal bandwidth of 30 kc.

A 6-mc. phase-modulated crystal oscillator is followed by four tripler stages and a doubler output stage to get the desired output frequency. The receiver is a double superheterodyne with crystal-controlled oscillator and a tunable-cavity preselector at the input. The receiver's audio-frequency amplifier is three-stage type-pentode voltage amplifier, pentode phase inverter, and push-pull pentode output tubes.

Preproduction models of this equipment were installed early in 1949 at Pennsylvania Electric Corp. Operation on 24-hr. day has proved its reliability. —Electronics, Sept, p90

Making Core-Box Pattern

Aluminum core boxes for large cores can be made at a lower cost than those made of wood. This is possible with a new method for producing master shell patterns that was developed by Cooper Alloy Foundry Co.

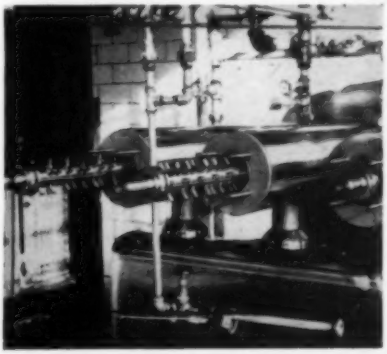
A core plug is mounted on a plywood board and brushed with graphite, which acts as separator. Then the plug is sprayed to 3/16-in. thickness with a low-melting-point alloy. Ribs for reinforcement and bosses for dowels and blow holes are added.

For larger core boxes, the alloy is sprayed to 1/64-in. thickness, covered with cheese cloth and shellac, sprayed, and covered with burlap dipped in plaster of paris. Ribs are then added.

Although the shell pattern is strong enough to stand molding, the core plug should be used as a ram-up block to preserve the pattern. The core box is then cast of aluminum alloy.—Iron Age, Sept 7, p104

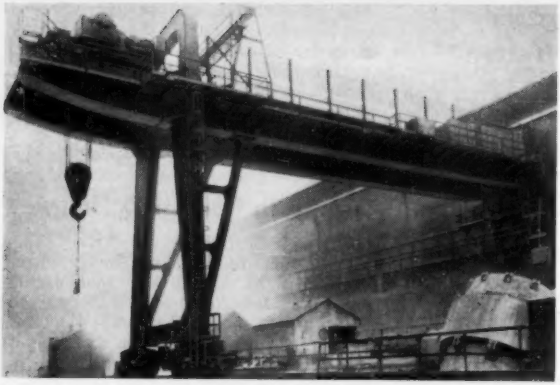
Swamp to Road in 6 Hours

A cellular concrete substance called Thermo-Con recently demonstrated its usefulness as a military roadbuilding material. Reinforcement was laid directly on an uncleared swamp; then special lightweight Thermo-Con was pumped into forms through a hose. After 6 hr., the strip was ready for work even though a 10-foot pole could be sunk into the swamp right at its edge.—Business Wk, Sept 16, p46



MIXING BETTER CAKES

Continuous mixing of cake batter at Farm Crest Bakeries, Detroit, gives better mixing control, better shop sanitation, greater shop capacity, less mixer-to-oven time lag, consistent batters, and higher-quality cakes. This Votator mixer, made by Girdler Corp., is a three-tube unit with hundreds of small pins on whipper shafts that whip batter to fine emulsion. Capacity is 1,500 lb. per hr.—Food Ind, Sept, p51



HUGE GANTRY

This 125-ton single-leg gantry crane, largest of its type ever built, serves four bessemer converters in world's largest pipe mill at National Tube Co. Crane, made by Cleveland Crane & Engrg. Co., is all-welded and has box-section portal type leg to give maximum torsional rigidity. Box sections are hermetically sealed to reduce corrosion. Each of four pairs of trucks has a direct-connected drive motor.—Steel, Aug 28, p82

Gas or Electric Torches Hot-Gas-Weld Thermoplastics

Thermoplastics, particularly polythene and polyvinyl chloride, are readily welded by the hot-gas technique. This late and flexible development resembles gas welding of metals.

Torches are either gas or electric. In the gas torch, air or gas passes through a spiral heated outside by a gas flame. In the electric torch, air or gas is passed through a labyrinth around a heating element.

The heat-carrying agent should preferably be an inactive gas, such as nitrogen or carbon dioxide. Pressure is 5-15 psi., nozzle temperature 500-600° F., and weld temperature 375-425° F.

Welding of metals and plastics differs in that plastics bond when the material is in a softened condition but not fused. Methods are similar in joint preparation, use of a spline (filler rod), and variety of shapes welded.

Joint beveling can be done with file, planer, or grinding wheel. The spline is held at 90°, and the torch at 45° to the welding surface. As the part and spline soften, the torch is slightly withdrawn. Welding should be downhand. Vertical or overhead welding takes skill and experience.

Plastic welding finds uses in fabricating vats, buckets, jugs, pipelines, fume ducts and in lining tanks, fermentation vats, yeast buckets, funnels.—Weld Eng, Sept, p35

Jet-Engine Overhaul

Jet-engine overhaul is being done on a production scale at Tinker Air Force Base. First the engine is stripped of all accessories. Each unit is tagged and routed to special departments for soaking, repair, and testing.

Then the engine is separated into its components. Each overhauled component is returned to the specific engine of which it was a part.

Inspection of all parts is made for cracks and flaws. After reassembly, the engine goes to a test cell and checks are made of ambient air, compressor and tailpipe temperature, specific fuel consumption at various rpm., and thrust values. The turbine wheel is rechecked for cracks and flaws. A corrosion preventive oil is run through the engine.—Aviation Wk, Sept 18, p26

Modern Exhaust Ventilation Keeps Neighborhood Clean

Any gray-iron foundry with a melting capacity of 52 tons per hr. generates considerable dust, fumes, and smoke. But the International Harvester plant at Louisville has been successful in keeping them under control.

Exhaust ventilation plays the biggest part in keeping the foundry clean. Dust-laden air at 650,000 cfm. passes through 20 dry and 7 wet Roto-Clones before it is discharged outside. An additional 750,000 cfm. ventilate cooling tunnels and pouring stations. Still another 152,000 cfm. removes smoke at the shakeout.

Cupolas are equipped with hot-blast systems. The hot-blast portion of the stack gases is cleaned by three wet cleaners and skimmer precleaners before gases are released.

The plant is located next to the municipal airport. The cleaning installation has been so efficient that there has been no interference with air traffic from smoke or fumes.—Foundry, Sept, p108

Steel and Wood Car Floor

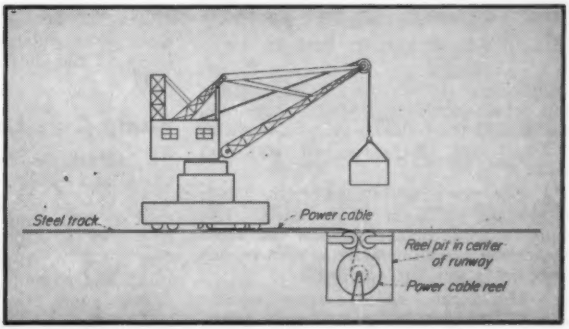
Both steel and wood afford greater strength and longer life in box-car, gondola, and flat-car floors. Developed by Armco Steel Corp., the floors consist of hat-shaped steel ribs, placed across the width of the car and welded to the center sill, stringers, and side-sill angles, alternated with wood planks bolted to the rib flanges. Top surfaces of the hat section form part of the floor. Since they extend slightly above the wood planks, they support most of the load and take the wear.

Over-all cost, including first cost and replacement, is expected to be 45-50% less than conventional wood flooring.—Railway Age, Sept 16, p61

New Free "Port" Is Inland

Mexican truck bodies, alligator hides, pumpkin seeds and Japanese binoculars are a sampling of the goods that arrived for the opening of U. S. Foreign Trade Zone No. 6, San Antonio, Tex.

Unlike the other five trade zones (New York, Seattle, San Francisco, New Orleans, and Los Angeles), San Antonio is located inland—at an airport instead of a seaport. It is the first zone of its kind to be established and operated by private business—the Scobey Fireproof Storage Co. (McG-H Digest, April, p18). Served by fast trains and trucks from Mexico and Texas ports, it covers 7½ acres, has cold storage, fumigation, safe-deposit, washing, and manufacturing facilities.—Business Wk, Sept 16, p134.

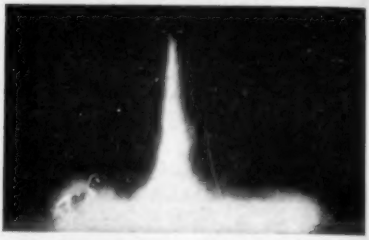


ELECTRIC CRANE

This electric-motor-driven crane has motor and controls on crane itself. It needs no third rail or trolley. Power is fed to crane through rubber cable between tracks. Stalled torque motor winds cable and keeps tension on it. Crane may run to right or left of cable-reel pit.—Elec World, Sept 11, p126

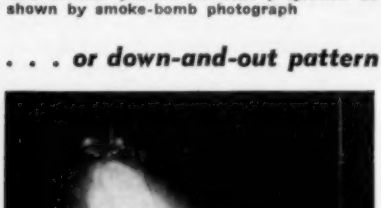
Unit heaters—normal pattern or downward throw . . .

Projection-type heater without diffuser gives this normal pattern of heat projection as shown by smoke-bomb photograph



Adjustable diffusing vanes on Trane Co.'s unit heater can direct heat straight down to comfort zone with 60% greater throw

. . . or down-and-out pattern to descending blanket



Change in diffuser setting gives down-and-out pattern that is good for blanketing open doorway and diffusing air about room

Diffuser blades completely closed spread heated air in a horizontal blanket.—Power, Sept, p108

Clean Magnesium Easier

Magnesium can be drawn deeper than any other metal, but a major problem is removal of the colloidal graphite used as the lubricant. Here are two ways that help:

1. Use raw sheet instead of sheet with a chrome pickle or oiled finish. The oxide coating that forms on the sheet makes the graphite easier to remove, but does not affect surface finish.

2. Use a graphite of coarser particle size. Fine particles give deeper draws and better finishes, but are harder to clean off the sheet.—Am Mach, July 24, p147

Ramp Cuts Loading Costs

An adjustable hydraulically operated ramp and bridge plate has cut labor costs 15% at the Norfolk Navy Supply Center. The ramp has two bridge plates. One is 42 in. wide and extends out 36 in. The other runs the full width of the ramp and extends out 14 in. Two hydraulic rams raise one end of ramp to the desired level.—Factory, Sept, p124

Hints on Buying a Truck

Which truck to invest in is not an easy decision. These ideas will help you in making the selection best suited to your job

DETAILED ANALYSIS of the buyer's needs and of his operating conditions is necessary if the buyer is to get economical and reliable service from his new truck. The seller should study the basic chassis models and the choice of optional features such as gearing and tires. He should thoroughly know all the features of the truck and be able to explain them to a prospective buyer.

. . . The buyer must specify the type of work required of the truck

The nature of the loads has a direct bearing on the buyer's decision. Where heavy concentrated loads are encountered, special reinforcements for frame and body are likely to be needed. Lightweight containers would require a large body and a long wheelbase for economical operation.

Truck speed is an important consideration. The owner has a choice between high road speeds or ability to haul full loads up steep grades. A truck can operate economically at 10% greater gross vehicle weight at lower speeds in the city than its rating for over-the-road work.

Speed desired is related to both trip schedules and traffic ability. Enough power for 60 mph. is unnecessary if only 35 mph. is needed. Fast acceleration (at a price) is not warranted unless certain conditions call for it.

Speed is also related to the time drivers are on the road. The owner must pay his drivers for their time. If more power and extra speed can decrease the time spent on the road, then it should be considered. If the truck will return to its base partly loaded, an overdrive transmission or two-speed rear axle will allow a higher return-trip speed. This is also advisable where level roads permit higher speeds with full loads.

. . . Choice between truck or tractor-trailer should be carefully considered

A tractor with a semi-trailer handles greater loads than a comparable "straight" truck. Many models carry double ratings. The larger is specified as gross combination weight (total weight of tractor, trailer, and pay load), and the smaller as gross vehicle weight (weight of body, chassis, and load) for use as a "straight" truck.

Tractor-trailer combinations are good for long distance over-the-road cargo hauling. Sharp curves may dictate the use of a tractor-trailer for ease of con-

STONE STOPPERS PREVENT DAMAGE

Damage to equipment by rocks rolling under the frames of large stripping shovels has been greatly reduced by adding stone stoppers at the Hanna Coal Co. Stopper consists of an assembly of three 12-in. steel pipes 8 ft. long hung by a wire rope. To weight the pipes, they are filled with iron punchings. Connections between pipes are hinged joints that permit free swing.—Coal Age, Sept, p105

trol. "Straight" trucks are better for exclusively city delivery use and for short, local hauls.

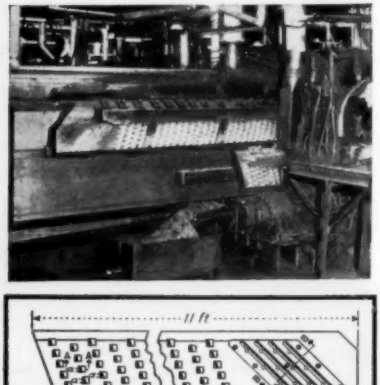
. . . Wheel arrangement and rear-axle ratios are important

Usually two types of wheel arrangements are available: four wheel and six wheel. A "four-wheel" truck means a two axle model with dual wheels at the rear. "Six-wheel" trucks have a four-wheel driving group at the rear with all four dualed.

A four-wheeled truck, wherever possible, means reduced investment and maintenance. Six wheelers are often chosen because of length limits, loads, or customer preference. A large six wheeler may have greater load capacity than a small tractor-semi-trailer, but may not be as economical as using several trailers with one tractor.

The ordinary four-wheel truck carries about ⅔ of the weight on the rear axle, where the six wheeler carries as much as 80% divided between the two rear axles. Body length is important on both four and six wheelers in order to provide proper weight distribution.

A truck should be able to hold 150 rpm. under governed speed with full load on flat land. Too high a rear-axle ratio means that the driver is working through gears too much of the time. Mountain-type operation needs sufficient power together with over-all gear reductions. In flat or rolling terrain, split-type gearing of transmissions, overdrive, or two-speed rear axles may be necessary.



CARBIDE-TIPPED BROACHES

One U. S. automobile manufacturer has a unique broaching cutter setup (upper) that has machined 65,000 cylinder heads on top side and 180,000 on combustion-chamber side before resharpening. Cutters have single-point carbide-tipped roughing teeth and solid carbide finishing teeth. Between-grinds life is 20 times that of conventional broach. Section A-A (lower illustration) shows how single-point teeth are adjusted for height and locked in place. Section B-B shows method of holding solid carbide finishing blades.—Iron Age, Aug 17, p96

. . . Diesel or gasoline engines and cab design are factors in truck selection

Two factors are important in choosing a diesel or gasoline engine. Diesel advantages are lower fuel consumption and lower fuel costs. However, initial cost is higher. The owner should know the annual mileage and operating conditions expected, before making a decision. The second factor is conditions of operation. The relatively low-speed diesel engine often makes overdrive transmissions or two-speed rear axles worth while.

Another factor in truck selection is the cab. Drivers are entrusted with many thousands of dollars worth of equipment and load. Anything within reason that can be done to make them comfortable through good vision, ventilation, and roomy comfort will pay dividends in the form of more careful handling of the vehicle.—Am Auto, Sept, p46

ELECTRONIC ANESTHESIA CONTROL

Electrical activity of the brain changes according to depth of anesthesia. Putting this electrical output to work in this servoanesthetizer, developed at Mayo clinic, causes anesthetic to be fed to patient at proper rate for desired anesthesia. Brain output is picked up by electrodes on patient's head. Other units of servoanesthetizer are amplifier, integrator, transducer, and anesthetic reservoir and piston feed.—Electronics, Sept, p107

Turning Cams Saves Time

Direct-reversing diesel engine made by Cooper-Bessemer Corp. has a sliding camshaft with inlet and outlet cams. These cams have separate surfaces for forward and reverse rotation with a blended surface between cam surfaces.

Originally, the machining was done on a milling machine with extensive tooling. But the cams are now turned on a Cincinnati profiling lathe that has two spindles—one for the work and the other for a master cam. Hydraulic cam follower controls movement of single-point tool.

Result: 1 hr. and 42 min. saved in machining time on each cam.—Am Mach, Aug 21, p126

Cold-Reduced Steel Better As Magnetic Core Material

Improved punchability, equivalent magnetic properties, and thinner, less abrasive surface oxides are the reasons why cold-reduced sheet steel is gaining favor as magnetic core material for rotating electrical machinery.

Processing methods vary widely from those of hot-rolled silicon steel, but magnetic properties are essentially the same. The differences in processing, especially in annealing, result in the thinner oxide coating on the cold-reduced steel.

The improved punching properties are due to the thinner oxides and the use of continuous coils. Partial punchings at the end of cut-to-length sheets, and therefore mispunchings, are thus avoided.

Another benefit from the thinner oxide layer is the better lamination, or space, factor. Because of space limitations, the amount of material in a given height of stacked laminations is important to machinery performance. Thinner oxides permit more steel in the stack.—Steel, Aug 28, p72

Conveyor Cushions Loads

A long surge bin interposed in the main-line conveyor has materially increased efficiency at a Pardee and Curtin Lumber Co. mine.

A 140-ft. chain conveyor with standard side panels was installed to receive coal from two section belts and the main-entry development belt and to act as a feeder to the main-line belt. To each side panel were added two 3x8-in. planks forming a surge bin 3½ ft. deep of approximately 50-ton capacity.

The surge bin allows high-speed operation of section belts, thus speeding up the dumping of shuttle cars. Also, the bin loads the main conveyor uniformly, giving it large capacity at low speed and with minimum spillage.—Coal Age, Sept, p102

BETHLEHEM Steel Products

come Direct from Mill to You . . .

Handling Risks are Minimized

Bethlehem's great Sparrows Point plant in the Port of Baltimore is the only steel-producing plant in the U.S.A. located on tidewater. Products for export can be loaded at this plant directly aboard steamers, thereby minimizing possible damage due to additional handling.

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Production Ideas

from Manufacturers' Catalogs

11-1 Nylon in Industry—E. I. du Pont de Nemours & Co., Inc. 32p. "Nylon Textile Fibers in Industry" tells how nylon can improve your product or production method—or help create a new product.

11-2 Diesel Power Unit—International Harvester Export Co. 8p. Pamphlet E-107-NN gives specifications, performance charts, and equipment combinations of 45-hp. model UD-6A diesel engine and power unit.

11-3 Hydraulic Turbines — Allis-Chalmers Mfg. Co. 56p. Catalog 02B7301 is an exceptional treatment on Francis, propeller, and impulse turbines. Application illustrations are outstanding, showing what can be done with water power.

11-4 Vibratory Feeders—Syntron Co. 24p. Reprint describes and illustrates feeders for bulk material. Schematic layouts show applications and arrangements.

11-5 Pressure Vessels—A. O. Smith Corp. 52p. Three bulletins—V-44, V-46, and V-52—describe types of pressure vessels manufactured, their assembly in the field, and an improved method of building vessels.

11-6 Disk Grinding—Grinding Wheel Institute. 18p. "Safe Rules and Methods" for disk grinding describes mounting, storage, and handling methods.

11-7 Formica in Industry—Formica Co. 16p. Form 181 tells what Formica is, where and how it is used, and advantages this plastic offers.

11-8 Speed Reducers—Falk Corp. 96p. Four engineering bulletins—1110, 1115, 2105, and 2110—illustrate and describe parallel-shaft speed reducers and right-angle speed reducers (both horizontal and vertical). Extensive tables are included.

11-9 Textile Fire-retardant — Monsanto Chemical Co. 10p. Technical Bulletin P-28 discusses imparting of fire-retardant properties to textiles by treating with ammonium phosphate solution.

11-10 Copper-ore Refining—American Cyanamid Co. 8p. "Current Reagent Practice on Copper Ores" supplies data on current flotation practice with Aerofloat flotation reagents. Case studies are given to aid the engineer.

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11-13 Silicones—Dow Corning Corp. Form GC2 is a reference guide to company's silicone products and available data sheets. Guide lists 53 types of products.

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Production Ideas (Cont.)

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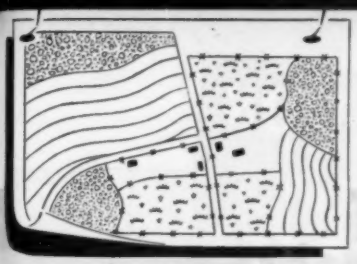

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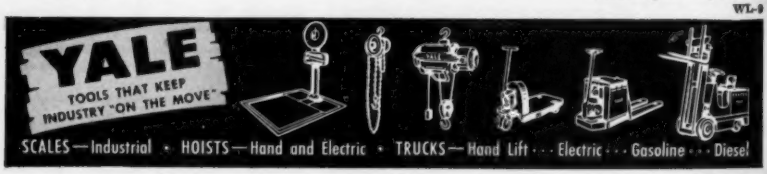
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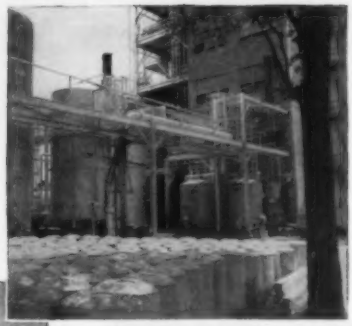

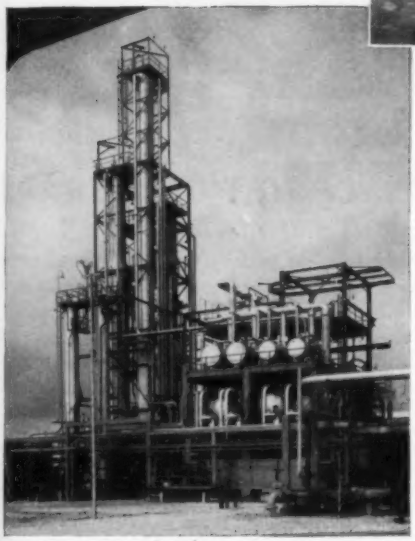

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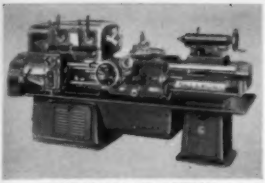

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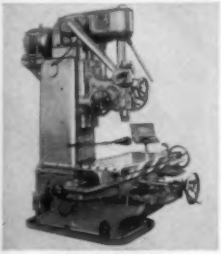

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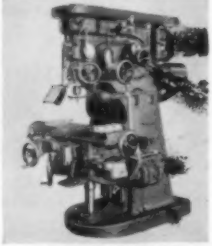

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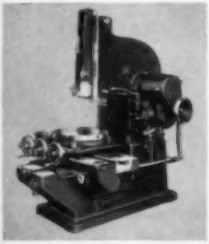

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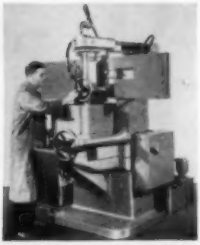

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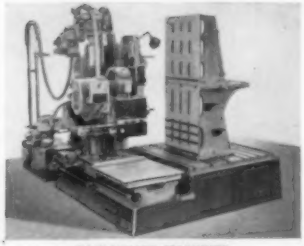

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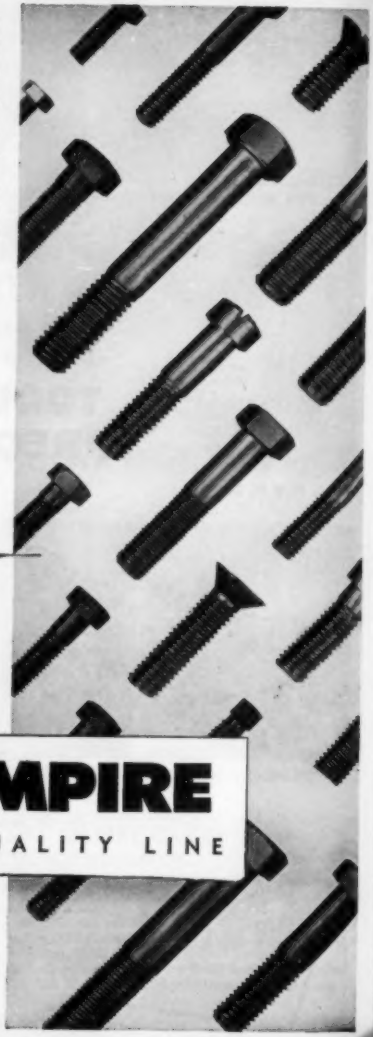

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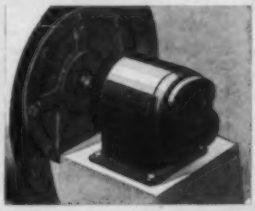

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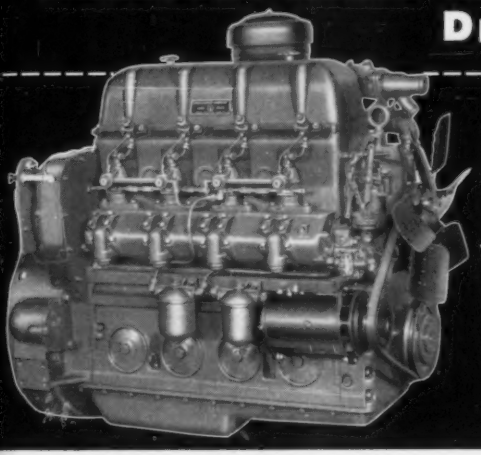

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ALLIS-CHALMERS MANUFACTURING CO... 2
Compton Advertising, Inc.

AMERICAN CYANAMID CO..... 69
Hazard Advertising Co.

BANK OF AMERICA..... 70
Chas. R. Stuart Adv.

BETHLEHEM STEEL EXPORT CORP..... 60
Gotham Adv. Co. Inc.

BLAW-KNOX CO..... 75
Al Paul Lefton Co., Inc.

BLISS CO., E. W..... 68
Fred Wittner Adv.

CLARK EQUIPMENT CO..... 79
Gebhardt & Brockson, Inc.

CUMMINS DIESEL EXPORT CORP.....3rd Cover
Needham, Louis & Brorby, Inc.

DOW CHEMICAL OF CANADA, LIMITED... 11
Harold F. Stanfield Ltd.

du PONT de NEMOURS & CO. (INC.), E. I. 4, 5
Robert Otto & Company, Inc.

ELECTRIC AUTO-LITE CO..... 67
National Export Advertising Service Inc.

EX-CELL-O CORPORATION..... 65
Holden, Clifford, Flint Inc.

FAIRBANKS MORSE & CO., INC..... 77
The Buchen Co.

GENERAL MOTORS OVERSEAS OPERATIONS. 8

GOVERNMENT OF CANADA..... 80
Walsh Adv. Co., Ltd.

HYDRAULIC PRESS MFG. CO..... 76
The Jay H. Maish Co.

INTERNATIONAL GENERAL ELECTRIC CO.. 73
Grant Advertising, Inc.

INTERNATIONAL HARVESTER EXPORT CO.. 63
McCann-Erickson Corp.

LOS ANGELES HARBOR, BOARD OF HARBOR COMMISSIONERS 1
Brooks Adv. Agency.

McGRAW-HILL BOOK CO..... 74

MONSANTO CHEMICAL CO.....2nd Cover
Gardner Advertising Co.

NORDBERG MANUFACTURING CO..... 12
Russell T. Gray, Inc.

PRATT & WHITNEY..... 71
Walter B. Snow & Staff Inc.

REMINGTON RAND, INC..... 7
Leeford Advertising Agency, Inc.

RUSSELL, BURDSALL & WARD BOLT & NUT CO. 72
James Thomas Chirurg Co.

STANDARD OIL COMPANY (NEW JERSEY).. 66
Foreign Advertising & Service Bureau, Inc.

TOWMOTOR CORPORATION..... 16
Howard Swink Advertising Agency Inc.

UNION CARBIDE & CARBON CORP..... 6
J. M. Mathes, Inc.

WESTINGHOUSE ELECTRIC INT'L. CO. 4th Cover, 15
National Export Adv. Service

YALE & TOWNE MFG. COMPANY..... 64
Fuller & Smith & Ross, Inc.

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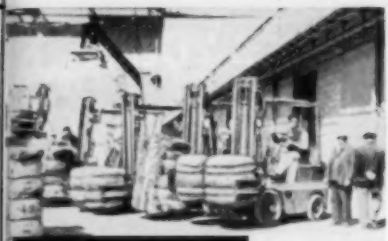

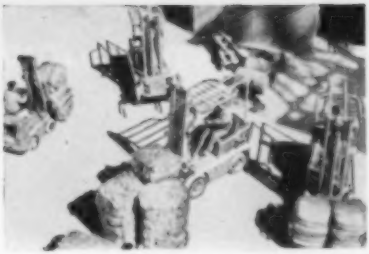

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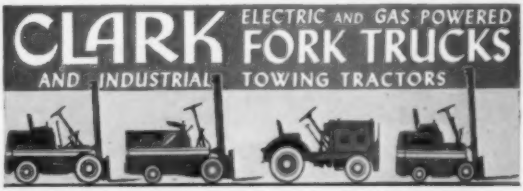
Fork-lift trucks and industrial towing tractors have revolutionized the whole concept of handling. French economy has been quick to appreciate the substantial economies in production and storage operations, to say nothing of the higher rhythm of rationalized handling. And this has been one of the lesser known but important factors in the spectacular recovery and keen competitiveness of France.

To take advantage of similar economies in other countries, consult your local Clark distributor. For his name and address please write to Export Division, Clark Equipment Company.



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